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ABSORPTION COEFFICIENTS OF AIR

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ABSTRACT

Tables of integrated absorption coefficients have been evaluated for high-temperature air by summation of the contributions from the following discrete transitions:

NO	$X^2\Pi \rightarrow B^2\Pi$	Beta
	$X^2\Pi \rightarrow A^2\Sigma$	Gamma
O_2	$X^3\Sigma_g^- \rightarrow B^3\Sigma_u^-$	Schumann-Runge
N_2	$A^3\Sigma_u^+ \rightarrow B^3\Pi_g$	First positive
	$B^3\Pi_g \rightarrow C^3\Pi_u$	Second positive
N_2^+	$X^2\Sigma_g^+ \rightarrow B^2\Sigma_u^+$	First negative

and from the following continuous transitions:

O^-	Photodetachment absorption
N, O	Photoelectric absorption from excited states
e	Free-free absorption in the presence of ionic fields

The tables have been computed for dry air in the temperature range from 1,000°K to 12,000°K, at equal energy increments of 0.25 ev (2,016.5 cm^{-1}), in the wavelength range from 1,167 Å to 19,837 Å, and for density ratios relative to sea level, ρ/ρ_0, at each order of magnitude from 10 to 10^{-6}.

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ABSORPTION COEFFICIENTS OF AIR

1. INTRODUCTION

The absorption of radiation by air is of great contemporary interest, particularly at optical wavelengths, and in a number of overlapping fields. As a contribution to the research in this area, the Appendix to this report contains tables of the absorption coefficients of air. The tables also show the major absorbing constituents of air at 0.25 ev (2,016.5 cm^{-1}) increments over the wavelength range from 1,167Å to 19,837Å for every 1000°K temperature increment between 1,000°K and 12,000°K, and for the eight orders of magnitude of density ratio relative to sea level, ρ/ρ_0, from 10 to 10^{-6}.

The tables have been prepared mainly from existing theoretical data on the absorbing constituents, although, where possible, experimental data have been incorporated. The incorporation has been done in such a way that revision of the experimental data in the light of further measurements will not render the tables useless; they would merely require an appropriate linear rescaling, consistent with new experimental measurements.

The calculations, which are an extension of earlier studies of Meyerott (1955, 1956, 1958), differ from some of the work of Kivel and Bailey (1957) by taking into account vibrational transitions in the absorbing species. Recent work by Kivel, Mayer, and Bethe (1957), and by Keck, Camm, Kivel, and Wentink (1959), has taken some account of these vibrational effects in the interpretation of the emission spectra from shock-heated air, but their work treats a considerably smaller range of temperatures, densities, and wavelengths than are presented in the tables in the Appendix to this report. However, comparison between the findings of this report and the tables and the data of the above workers were in agreement with the points tested at a number of these points.

The constituents of dry air of importance in discrete absorption are N_2, O_2, N_2^+, and NO. Those of importance in continuous absorption are N, O, O^-,

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and electrons in free-free transitions in the presence of positive ions. It was thought that NO_2 might make a significant contribution, but the experimental and theoretical information available for this is very scarce. Some measurements by Dieke, Heath, and Petty (1958) at about $1000^{\circ}K$ are included in our table for comparison. They indicate that the overall contribution from NO_2 is small at that temperature and that it decreases rapidly with density. One should note, however, that in practical applications there is often a considerable depth of cold air between the source and the observer which absorbs all wavelengths below $3000\,\mathring{A}$. In the remaining near ultraviolet and visible region of the spectrum the contribution due to NO_2 certainly is extremely important, and a future study should investigate this very carefully. There is also a possibility that N_2O_3 may make some contribution at low temperatures (Melvin and Wulf (1931, 1935); Moore, Wulf, and Badger (1953), and this also should be investigated.

2. ABSORPTION COEFFICIENTS AND RELATED QUANTITIES

2.1 DISCRETE ABSORPTION

The absorption coefficient $\mu_{LUv''v'J''J'}$ of the $J'' - J'$ rotational line of the $v'' - v'$ vibrational band of the L(ower)-U(pper) electronic transition is:

$$\mu_{LUv''v'J''J'} = \frac{8\pi^3}{3hc}\,\nu_{LUv''v'J''J'}\,N_{Lv''J''}\sum_{M'M''}\frac{|D|^2}{2J''+1}\,F \qquad (1)$$

where

$\nu_{LUv''v'J''J'}$ = frequency of the line center

$N_{Lv''J''}$ = population of absorbing molecules in the L state, v'' level, and J'' level

F = line shape factor, where $\int F dv = 1$

M', M'' = magnetic quantum numbers

D = multipole matrix element (often dipole matrix element for strong transitions) = $\int \Psi_u^* M \Psi_L d\tau$

Here M is the multipole moment of the transition, Ψ_u, Ψ_L are the total molecular wave functions of the upper and lower states respectively, and $d\tau$ is the element of configuration space for the whole molecule.

By use of the Born-Oppenheimer (1927) approximation it is possible to separate the variables in the molecular wave functions into electronic and nuclear contributions (p. 199, Herzberg (1950). That is

$$\left.\begin{aligned} \Psi &= \psi_{el}\psi_{vib}\psi_{rot} \\ m &= m_{el} + m_{nucl} \\ d\tau &= d\tau_{el}\, d\tau_{vib}\, d\tau_{rot} \end{aligned}\right\} \tag{2}$$

After a little algebra

$$D = D_{el}^{LU} \cdot D_{vib}^{v''v'} \cdot D_{rot}^{J''J'} \tag{3}$$

where

$$\left|D_{el}^{UL}\right|^2 = \left|\int \psi_{el}^{U^*}\, m_{el}\, \psi_{el}^{L}\, d\tau_{el}\right|^2 = R_e^2(r) \tag{4}$$

$R_e(r)$ is called the electronic transition moment of the L-U transition, and is not in general independent of r, the internuclear separation [Fraser (1954), Nicholls (1958) and references therein]. Further, by using a "quasi-united atom" approximation it is often possible to define an effective electronic oscillator strength f_{LU} for the L-U transition through Eq. (5a).

$$f_{LU} = \frac{8\pi^2}{3h}\frac{m}{e^2}\nu_{LU}\left|D_e^{LU}\right|^2 \tag{5a}$$

For single electron transitions, the usual sum rule $\sum_L f_{LU} = 1 = \sum_U f_{LU}$, holds. Some remarks on the sum rules relating to the fraction of oscillator strengths

associated with individual bands, groups of bands, and groups of bands and continua are made at the end of this Section. An appropriate "average" frequency for the whole band system is $\bar{\nu}_{LU}$.

Also

$$\left| D_{vib}^{v''v'} \right|^2 = \left| \int \psi_{v'} \psi_{v''} \, d\tau \right|^2 = q_{v'v''} \tag{5b}$$

where

$$\sum_{v'=0}^{\infty} q_{v'v''} = \sum_{v''=0}^{\infty} q_{v'v''} = 1 \; .$$

The q-sum rules, which are a direct result of the orthogonality of the vibrational wave functions, involve a summation over all of the continuum levels as well as the discrete levels of the molecular potentials for L and U . The contribution from the continuum is negligible when there is only a small difference in the internuclear separations r_e of the two potentials. It can become significant (e.g., in the case of the Schumann-Runge system) when the separation is large. In the above, $q_{v'v''}$ is the Franck-Condon factor of the $v' - v''$ band. Arrays of Franck-Condon factors, computed on the basis of a Morse potential model, are available for most important transitions [Jarmain, Fraser and Nicholls (1953, 1955); Fraser, Jarmain and Nicholls (1954, 1958); Nicholls, Fraser and Jarmain (1959)]. References to arrays computed on the basis of other oscillator potentials are given by Nicholls (1958a). It may be noted in passing that the Morse potential now appears to be more realistic for many molecular transitions than has previously been supposed [Jarmain (1959a, b)].

Finally,

$$\left.\begin{aligned} & \left| D_{rot}^{J''J'} \right|^2 = S_{J''J'} \\ \text{where} \quad & \sum_{J'} S_{J''J'} = 2J'' + 1 \\ \text{and} \quad & \sum_{J''} S_{J''J'} = 2J' + 1 \end{aligned}\right\} \tag{5c}$$

$S_{J''J'}$ is the strength factor or the Hönl – London (1925) intensity factor of the $J'' - J'$ line. Tables of these factors, which determine in part the relative intensity distributions of lines within a band, are given by Herzberg (1950) and Johnson (1950).

Summing Eq. (1) over all lines of a band, and using Eq. (5c)

$$\int \mu d\nu = \frac{8\pi^3}{3hc} \bar{\nu}_{LUv''v'} N_{Lv''} \left| D_{el}^{LU} \right|^2 \left| D_{vib}^{v''v'} \right|^2 \tag{6}$$

where band $\bar{\nu}_{LUv''v'}$ is an "average" frequency for the band. The approximation in such an averaging procedure, which has been discussed by Nicholls (1952) and by Fraser (1954, 1959) is not severe when the band is compact. $N_{Lv''}$ is the population of the v'' level.

For a compact band system, $\bar{\nu}_{LU}$ of Eq. (5a) may be approximately equal to $\nu_{LUv''v'}$ of Eq. (6). Thus from Eqs. (5a), (5b) and (6)

$$\int_{Band} \mu d\nu = \frac{\pi e^2}{mc} N_{Lv''} f_{LU} q_{v'v''} \tag{7}$$

This equation is extremely important and indicates the control exerted upon the integrated absorption coefficient of a band by the population, Franck-Condon, and oscillator-strength factors. In order to present useful tables of absorption coefficients over equal frequency intervals $\Delta\nu$ (equivalent to equal energy intervals), we define an absorption coefficient averaged over $\Delta\nu$ as follows:

$$\bar{\mu}^{\Delta\nu} = 1/\Delta\nu \int_{\Delta\nu} \mu d\nu$$

If the region $\Delta\nu$ contains several bands whose contributions have to be added, then:

$$\bar{\mu}^{\Delta\nu} = \frac{1}{\Delta\nu} \sum_{Bands,\, \Delta\nu} \int \mu d\nu$$

Thus, the equation which was used in the construction of the tables in the Appendix is:

$$\bar{\mu}^{\Delta\nu} = \frac{\pi e^2}{mc\Delta\nu} \sum_{\Delta\nu} N_{Lv''} f_{LU} q_{v'v''} \tag{8}$$

The values of $N_{Lv'}$ were evaluated using Gilmore's (1955) data.

Rough experimental estimates and measurements are available for the electronic oscillator strengths f_{LU} for the band systems of importance to our work [Meyerott (1955); Keck, Kivel and Wentink (1957); Erkovitch (1956); Weber and Penner (1953, 1957); Weber (1957), Ditchburn and Heddle (1953, 1954); Marmo (1953); Mayence (1952)]. Since the experimental determinations were made by different methods, and because there does not seem to be complete unanimity either in the definitions and values of the oscillator strengths or in the methods by which the contributions of the different bands are allowed for, the following remarks are made in the interest of clarity and to specify our interpretation of oscillator strengths of bands and band-systems.

Some authors [e.g., Ditchburn and Heddle (1954)] find it convenient to divide the electronic oscillator strength of the L-U transition into contributions from each of the bands, and from the dissociation continuum of the complete v' or v'' progression in absorption and emission. They assert:

$$\underbrace{\sum_{v'=0}^{\infty} f_{v''v'}}_{\text{Absorption}} = f_{LU} = \underbrace{\sum_{v''=0}^{\infty} f_{v'v''}}_{\text{Emission}} \tag{9}$$

To avoid confusion, it is necessary to state clearly:

(1) The conditions under which this is true

(2) The meaning of the wavelength range (which is an extension of the range of integration λ_1 to λ_2 of an atomic absorption line in the usual expression $\int_{\lambda_1}^{\lambda_2} \mu \, d\nu = \frac{\pi e^2}{mc} N_L f_{LU}$ thus associated with the oscillator strength

(3) The way in which the absorption and emission intensity measurements become involved in the determinations of oscillator strengths

The absorption case is relatively well known and straightforward. In brief the sum rule holds well, and it is for this reason that the absorption method is always used where possible. The absorption intensity of the $v'' - v'$ band may be written:

$$I_{v''v'} = K\, N_{v''}\, \nu_{v''v'}\, B_{v''v'} \tag{10}$$

$B_{v''v'}$ is the induced transition probability (Einstein-B coefficient) and is proportional to $R_e^2(r)\ q_{v'v''}$, and K is a constant. Thus the sum of all the absorption intensities, including dissociation continuum in a v' progression (v'' = const, usually 0) is

$$I = \sum_{v'=0}^{\infty} I_{v''v'} = \text{const } N_{v''} \sum_{v'=0}^{\infty} \nu_{v''v'}\, B_{v''v'} \tag{11}$$

The oscillator strength f_{LU} of an atomic absorption line may be defined through

$$f_{LU} = \text{const } N_L\, \nu_{LU}\, B_{LU} \tag{12}$$

On defining by analogy an effective oscillator strength for the $v''v'$ band, viz,

$$f_{v''v'} = \text{const } \nu_{v''v'}\, B_{v''v'} = \text{const } I_{v''v'} / N_{v''} \tag{13}$$

we can write from Eqs. (11), (12), and (13)

$$I = \sum_{v'=0}^{\infty} I_{v''v'} = \text{const } N_{v''}\, f_{LU} = \text{const } N_{v''} \sum_{v'=0}^{\infty} f_{v''v'} \tag{14}$$

The absorption sum rule of Eq. (9) is clearly evident in Eq. (14). It should be mentioned that, although the contribution from the dissociation continuum of the U state is often negligible, it does become significant in some cases (e.g., Schumann-Runge system). The effective band oscillator strength as defined in Eq. (13) is largely controlled by the relative value of $q_{v''v'}$ (which is intrinsically contained in $B_{v''v'}$). If $R_e(r)$ varies with r, this fact will also influence $B_{v''v'}$ and therefore $f_{v''v'}$. The wavelength range over which the measurement of the oscillator strength may be considered to be distributed is the wavelength range of the v' progression (including the dissociation continuum if significant), v'' = const.

Some aspects of the emission case are a little less obvious. The intensity $I_{v'v''}$ of the emission v' − v'' band is given by

$$I_{v'v''} = K\, N_{v'}\, \nu^4_{v'v''}\, B_{v'v''} \tag{15}$$

since the spontaneous emission transition probability (Einstein-A coefficient) is proportional to $\nu^3_{v'v''} B_{v'v''}$. The mean lifetime $\tau_{v'}$ of the v' level radiating to all of the v'' levels including the dissociation continuum of L is given by

$$1/\tau_{v'} = \text{const} \sum_{v''=0}^{\infty} \nu^3_{v'v''} B_{v'v''} = \text{const} \sum_{v''=0}^{\infty} I_{v'v''}/N_{v'}\, \nu_{v'v''} \tag{16}$$

In the case of an atomic oscillator strength, the equivalent atomic lifetime of the upper atomic level is given by

$$1/\tau_U = \text{const}\ \nu^3_{UL} B_{UL} = \text{const}\ f_{UL}\, \nu^2_{UL} \tag{17}$$

Thus, defining an effective oscillator strength $f_{v'v''}$ for the v' − v'' band by

$$f_{v'v''} = \text{const}\ \nu_{v'v''} B_{v'v''} \qquad \text{as before}$$

we have

$$1/\tau_U \cong 1/\tau_{v'} = \text{const}\, f_{UL}\, \nu^2_{UL} = \text{const} \sum_{v''=0}^{\infty} \nu^2_{v'v''}\, f_{v'v''}$$

$$= \text{const} \sum_{v''=0}^{\infty} \frac{I_{v'v''}}{N_{v'}\, \nu_{v'v''}} \tag{18}$$

Only when the band system is compact enough to permit writing

$$\sum_{v''=0}^{\infty} \nu^2_{v'v''} f_{v'v''} = \nu^2_{UL} \sum_{v''=0}^{\infty} f_{v'v''} = \sum_{v''=0}^{\infty} \frac{I_{v'v''}}{N_{v'}\, \nu_{v'v''}} \tag{19}$$

and only when the lifetimes of all the upper vibrational levels are equal as implied by Eq. (18), does the sum rule in emission [Eq. (9)] follow from Eqs. (18) and (19).

The effective wavelength range associated with a measurement is then that of the v'' progression $v' = \text{const}$. Care must be exercised not to include contributions from any bands within this wavelength interval which originate from levels other than the v' chosen. The same oscillator strength, to the degree of approximation specified above, should hold for any v'' progression.

Finally, in connection with the use of Eq. (8), tabulated data on Franck-Condon factors were available for the band systems of interest. These have been cited above and are discussed in detail in Section 3.1.3.

The above discussion relates to an optically thin layer of gas, and our calculations were carried out for this case. The effect of a thick layer may be described briefly as follows:

The intensity of light emitted by an isothermal region along a chord of length L is

$$I_\nu = B_\nu (1 - \exp - \mu'_\nu L) \tag{20}$$

where

$$\mu'_\nu = \mu_\nu (1 - \exp - h_\nu/kT) \tag{21}$$

and where B_ν is the Planck blackbody function. For optically thin regions (where $\mu'_\nu L << 1$ everywhere) there is no self-absorption in any of the lines and the result of a first-term expansion of the exponentials is

$$I_\nu = B_\nu \mu'_\nu L \tag{22}$$

where μ'_ν may be replaced by the average absorption coefficien. .. Eq. (8) Should there be self-absorption in the lines, such an averaging proce. . .s not valid, and line shapes and line spacing must be considered.

2.2 CONTINUOUS ABSORPTION COEFFICIENTS

In general these make a significant contribution only at high temperatures as is seen in the Appendix tables.

2.2.1 O^- Photodetachment Absorption

The photodetachment cross section of O^- has been computed by Bates and Massey [Bates and Massey (1943, 1947); Bates (1946)] and their results, together with with the experimental extension of the low-energy region of the cross-section curve by Branscomb and co-workers [Branscomb and Smith (1955), Branscomb, Burch, Smith, and Geltman (1958)] have been used here. Branscomb et al measured the photo cross section from an apparent threshold of 1.45 ev to 3 ev. Bates and Massey's data have been normalized to fit Branscomb's measurements.

2.2.2 Free-Free Absorption by Electrons in the Field of Positive Ions

The free-free absorption coefficient of electrons in the field of positive ions of charge Z is

$$\mu_{FF} = N_e N_i K_s \tag{23}$$

A formula for K_s was developed by Sommerfeld and has been evaluated numerically by several authors. In particular if we write

$$K_s = \bar{g} K_k \tag{24}$$

then K_k, which was derived semiclassically by Kramers [Chandrasekhar (1939)], is given by

$$K_k = \frac{4}{3\sqrt{3}} \frac{Z^2 e^2}{hc} \left(\frac{e^2}{mc^2}\right)^2 \lambda^3 \left(\frac{m}{2kT}\right)^{1/2} \tag{25}$$

and $\bar{g}$ is a factor derived by Gaunt to take account of deviations from Kramer's theory. It has been tabulated by Berger (1956) and a Maxwell average was used. In the temperature range of our tables $1.0 < \bar{g} < 1.2$. Further, we have assumed that $Z = 1$; $N_e = N_i$.

2.2.3 Photoelectric Absorption by Excited Levels of O and N

The photoelectric absorption by O and N from their excited states lies within the frequency range of our tables. The photoelectric cross section is:

$$\sigma_{PE} = \frac{\pi e^2}{mc} \frac{df}{d\nu} \tag{26}$$

In our work the transitions from excited levels of O, N, N_2 which correspond to principal quantum numbers $N = 3$, or higher, of a hydrogen-like model are important. These excited states are more nearly hydrogenic than the ground states, and we have therefore estimated df/d_ν on a hydrogen-like model, σ_{PE}, and thus from Eq. (26) $df/d\nu$ varies roughly as ν^{-3} at any particular photoelectric absorption edge. For H, levels of $n \approx 3$ have a total oscillator strength to the continuum of ≈ 0.2 [Bethe and Salpeter (1957)]. These assumptions lead to

$$\frac{df}{d\nu} = 0.4 (\nu_i^2)/(\nu^3) \tag{27}$$

where ν_i is the ionization energy of the absorption edge. Thus the photoelectric absorption coefficient is

$$\mu_{PE} = 0.4 \frac{\pi e^2}{mc} N_i \frac{\nu_i^2}{\nu_3} \tag{28}$$

where N_i is the number of atoms or molecules per cc in the state i . The number for $n \approx 3$ corresponding to energies of 10.3 ev or higher will be negligible at all but the highest temperatures in our range $\approx 12,000^{\circ}K$. Photoelectric absorption was therefore ignored at lower temperatures. At longer wavelengths, where effects of discrete bands are negligible, the photoelectric effect, while small, may be a major contributor, and further studies of it should be made. Calculations were made for O and N . The existence of a level at 4.1 ev in the case of O suggests that calculations at lower temperatures than we consider may reveal a contribution from O .

3. RESULTS AND BASIC DATA

In the tables of the Appendix, computations of $\bar{\mu}^{\Delta\nu}$ are presented at 0.25 ev ($2016.5\ cm^{-1}$) intervals of the absorption coefficients for the following discrete transitions:

N_2	$A^3\Sigma_u^+ \rightarrow B^3\Pi_g$	First positive
	$B^3\Pi_g \rightarrow C^3\Pi_u$	Second positive
N_2^+	$X^2\Sigma_g^+ \rightarrow B^2\Sigma_u^+$	First negative
NO	$X^2\Pi \rightarrow B^2\Pi$	Beta
	$X^2\Pi \rightarrow A^2\Sigma$	Gamma
O_2	$X^3\Sigma_g^- \rightarrow B^3\Sigma_u^+$	Schumann-Runge

The calculations are based on Eq. (8). Contributions from continuous-absorption processes discussed in Sections 2.2.1, 2.2.2, and 2.2.3 were obtained using the integral data of Eqs. (23) to (28).

The basic data on $N_{Lv''}$, N_i , f_{LU} , $q_{v'v''}$, ν_i , μ_{O^-} needed to perform the computations were obtained as described in the subsections to follow.

3.1 DISCRETE TRANSITIONS

3.1.1 Population Factors $N_{Lv''}$, N_i

The equilibrium composition of dry air (molecular species, ionic and electronic composition, etc.) was taken over most of our temperature and density ranges from Gilmore's (1955) tables and report. His tables were extended slightly to lower temperatures as shown in Table 1.

Table 1. Fraction of N_2 Molecules in Excited States at $3000^{\circ}K$ and $4000^{\circ}K$

State	$3000^{\circ}K$	$4000^{\circ}K$
$X'\Sigma$	1.00	1.00
$A^3\Sigma$	2.50^{-1}*	1.02^{-7}
$B^3\pi$	1.37^{-12}	2.08^{-9}

*In this and the other tables the superscripts indicate the power of 10; e.g., 2.50^{-1} means 2.50×10^{-1}.

Having established, with the use of Gilmore's tables, the relative population factors (N_L) of the electronic states for the molecular constituents from which the absorptions occurred, the relative populations $N_{Lv''}$ of the vibrational levels v'' were calculated assuming a Maxwell-Boltzmann energy distribution.

It may be mentioned in passing that Gilmore's tables on the equilibrium of dry air differ in a number of findings from the recent Russian data of Predvoditelev et al (1958).

3.1.2 Effective Molecular Electronic Oscillator Strengths f_{LU}

The effective oscillator strengths provisionally adopted are displayed in Table 2, where they are compared with some recently published data of Keck, Camm, Kivel and Wentink (1959).

Table 2. Effective Molecular Electronic Oscillator Strengths Selected

Transition	f_{LU} Selected	f_{LU} (Keck et al 1959)(6)
$N_2\ B^3\pi - C^3\pi$	0.07 (1)*	0.09
$N_2\ A^3\Sigma - B^3\pi$	0.02 (1)	0.025
$N_2^+\ X^2\Sigma - B^2\Sigma$	0.20 (2)	0.18
$NO\ X^2\pi - B^2\pi$	0.008 (3)	0.006
$NO\ X^2\pi - A^2\Sigma$	0.0025 (4)	0.001
$O_2\ X^2\Sigma - B^3\Sigma$	0.259 (5)†	0.028 (bands)

$^\dagger f_{continuum} = 0.215$

$f_{bands\ of\ v''} = 0$ progression

$= 0.044$

*References

1. Keck, Kivel, Wentink (1957)
2. Estimate. We have recently learned of a calculation of the oscillator strength of the N_2 first positive system by Bates and Witherspoon (1952). Using the LCAO method they obtained an f-number of approximately 0.002, which is an order of magnitude smaller than the number obtained by Keck et al.
3. Weber (1957)
4. Weber and Penner (1957) -- (They actually get 0.0024 rather than 0.0025.)
5. Ditchburn and Heddle (1953, 1954)
6. Keck, Camm, Kivel and Wentink (1959)

While the adequacy of the experimental measurements of oscillator strengths is discussed in Section 4, it may be briefly remarked here that the apparent discrepancy between Ditchburn and Heddle's measurements for the O_2 Schumann-Runge system (in absorption), and those of Keck et al (1959) in emission, arises from the fact that the former authors correctly measured the contribution from all the continuum, together with that from all the bands in the $v'' = 0$ progression, whereas Keck et al content themselves with the slightly cryptic remark, "The value obtained for the wavelength range 3300–4700Å was f = 0.028." Apparently no allowance was made for the continuum, and only a limited number of bands were treated by the latter authors. It should further be noted that Watanabe, Inn, and Zelikoff (1953) obtained an f-value of 0.161 for the same continuum studied by Ditchburn and Heddle.

3.1.3 Franck-Condon Factors $q_{v'v''}$

The Franck-Condon factor arrays which were used in the calculations are specified in Table 3.

Table 3. Franck-Condon Factors $q_{v'v''}$ used

Band System	Source of FCF Array
N_2 $A^3\Sigma$ - $B^3\pi$	For v', v'' > 10 (1)*; for v', v'' ≤ 9 (1, 2)
N_2 $B^3\pi$ - $C^3\pi$	(1)
N_2^+ $X_2^2\Sigma$ - $B^2\Sigma$	(3, 4)
NO $X^2\pi$ - $B^2\pi$	(5)
$X^2\pi$ - $A^2\Sigma$	(5)
O_2 $X^3\Sigma$ - $B^3\Sigma$	For v' ≤ 3, v'' ≥ 3 (6); v' ≤ 15, v'' ≥ 2 (7) Remainder, see Table 5 (8)

*References

1. Jarmain and Nicholls (1954)
2. Nicholls (1958)
3. Jarmain, Fraser and Nicholls (1953)
4. Nicholls (1956)
5. Kivel, Mayer and Bethe (1957)
6. Fraser, Jarmain and Nicholls (1954)
7. Jarmain, Fraser and Nicholls (1955)
8. Nicholls, Fraser and Jarmain (1959), and private communication

Franck-Condon factors for N_2 outside the range of those given in Jarmain and Nicholls (1954) are given [Jarmain and Nicholls (1958)] in Table 4. Similarly, Franck-Condon factors for the $v'' = 0$ progression of O_2 Schumann-Runge $v' = 16$-21, together with data for a few "hot" bands at $v' = 4, 5, 6, 7, 8$, are given [Nicholls, Fraser and Jarmain (1958)] in Table 5. See also Nicholls, Fraser and Jarman (1959).

Table 4. Franck-Condon Factors for N_2 First Positive

	0	1	2	3	4	5	6	7	8	9
0	0.338	0.325	0.190	0.0888	0.0365	0.0142	0.0052	0.0018	0.00068	0.0003
1	0.407	0.0023	0.103	0.178	0.145	0.0864	0.0437	0.0202	0.0086	0.0038
2	0.197	0.160	0.114	0.0012	0.0773	0.127	0.112	0.0751	0.0424	0.0223
3	0.0502	0.298	0.0388	0.163	0.0324	0.0090	0.0686	0.100	0.0906	0.0652
4	0.0072	0.132	0.274	0.0018	0.115	0.0882	0.0053	0.0180	0.0630	0.0817
5	0.00063	0.0276	0.211	0.181	0.0480	0.0433	0.106	0.0384	0	0.0211
6	0.00003	0.0030	0.0615	0.260	0.0829	0.105	0.0032	0.0818	0.0702	0.0162
7	1×10^{-6}	0.00017	0.0086	0.107	0.270	0.0190	0.130	0.0067	0.0400	0.0770
8	0	4×10^{-6}	0.00058	0.0188	0.156	0.243	0.00004	0.118	0.0369	0.0050
9	0	0	0	0.0019	0.0387	0.2094	0.1731	0.0251	0.0689	0.0745

Table 5. Estimated Franck-Condon Factors for O_2 Schumann-Runge

v',v"	q	v',v"	q
16,0	1.2^{-3}	6,3	1.0^{-2}
17,0	1.6^{-3}	5,4	7.0^{-2}
18,0	2.0^{-3}	6,4	3.0^{-2}
19,0	2.4^{-3}	7,4	3.0^{-2}
20,0	2.9^{-3}	8,4	6.0^{-2}
21,0	3.4^{-3}	5,5	2.0^{-2}
4,3	1.0^{-2}	6,5	5.0^{-2}
5,3	2.0^{-2}	7,5	7.0^{-2}

3.1.4 Wavelengths and Other Standard Molecular Data

Wavelengths were taken from Pearse and Gaydon (1950); outside the range covered in their compilation the wavelengths were calculated from the constants given in Herzberg (1950).

3.2 CONTINUOUS TRANSITIONS

Values of N_i needed for Eqs. (9) and (14) were taken from Gilmore's (1955) tables. Values of ν_i needed for Eq. (14) were obtained from Moore's (1949) compilation.

4. DISCUSSION

4.1 TABLES AND GRAPHS

The complete results are presented in the tables in the Appendix. These tables list the individual, and the sum of contributions, of the various transitions (both discrete and continuous) to the absorption coefficients. Figures 1 through 6 show the same results for a few representative values of ρ/ρ_0 and T. At the low end of the temperature range O_2 Schumann-Runge clearly dominates with the two NO band systems just beginning to appear. In the intermediate range the NO overtakes the O_2 and the first negative band system of N_2^+ dominates in the visible region. At the high end of the temperature range the continuous absorption takes over, with free-free transitions dominating in the infrared, and with the photoelectric effect on N and on O dominating the visible and the ultraviolet respectively.

Additional figures illustrate this in a semi-quantitative way. Figures 7 and 8 present for a given transition, the ratio of the maximum of μ to the sum of all such maxima as a function of temperature for normal and 10^{-6} normal air density. This is within the entire spectral region. Since there are no calculations between $8,000^{\circ}$K and $12,000^{\circ}$K the curves are not accurate in that interval, but they nevertheless show the general trend. Considering the importance of the visible region, due to the ultraviolet cut-off in cold air, we also present in Figures 9 and 10 the contribution to μ for wavelength $\lambda = 3967\text{Å}$.

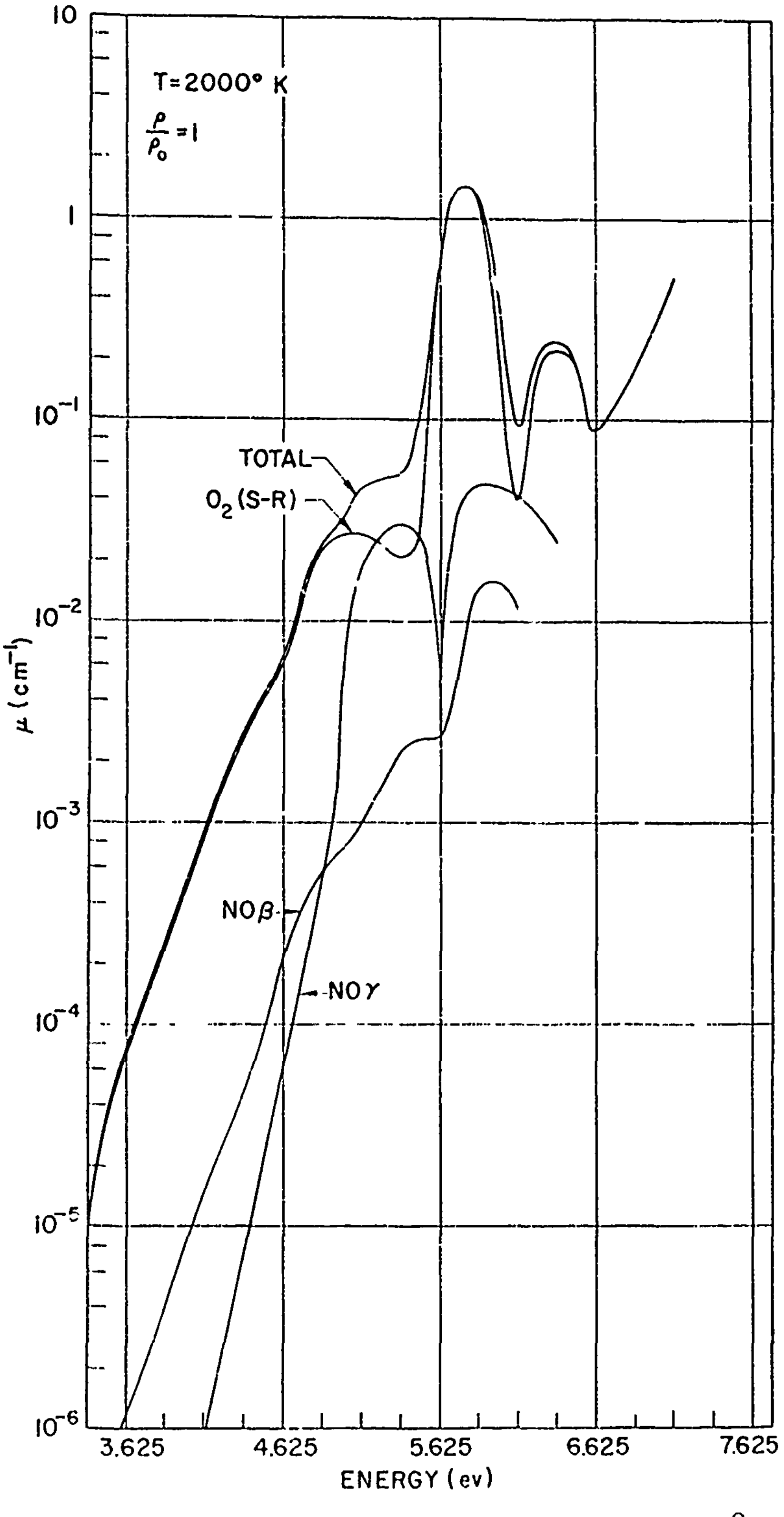

Fig. 1 Absorption Coefficient vs Photon Energy: T = 2000^{0}K, ρ/ρ_0 = 1

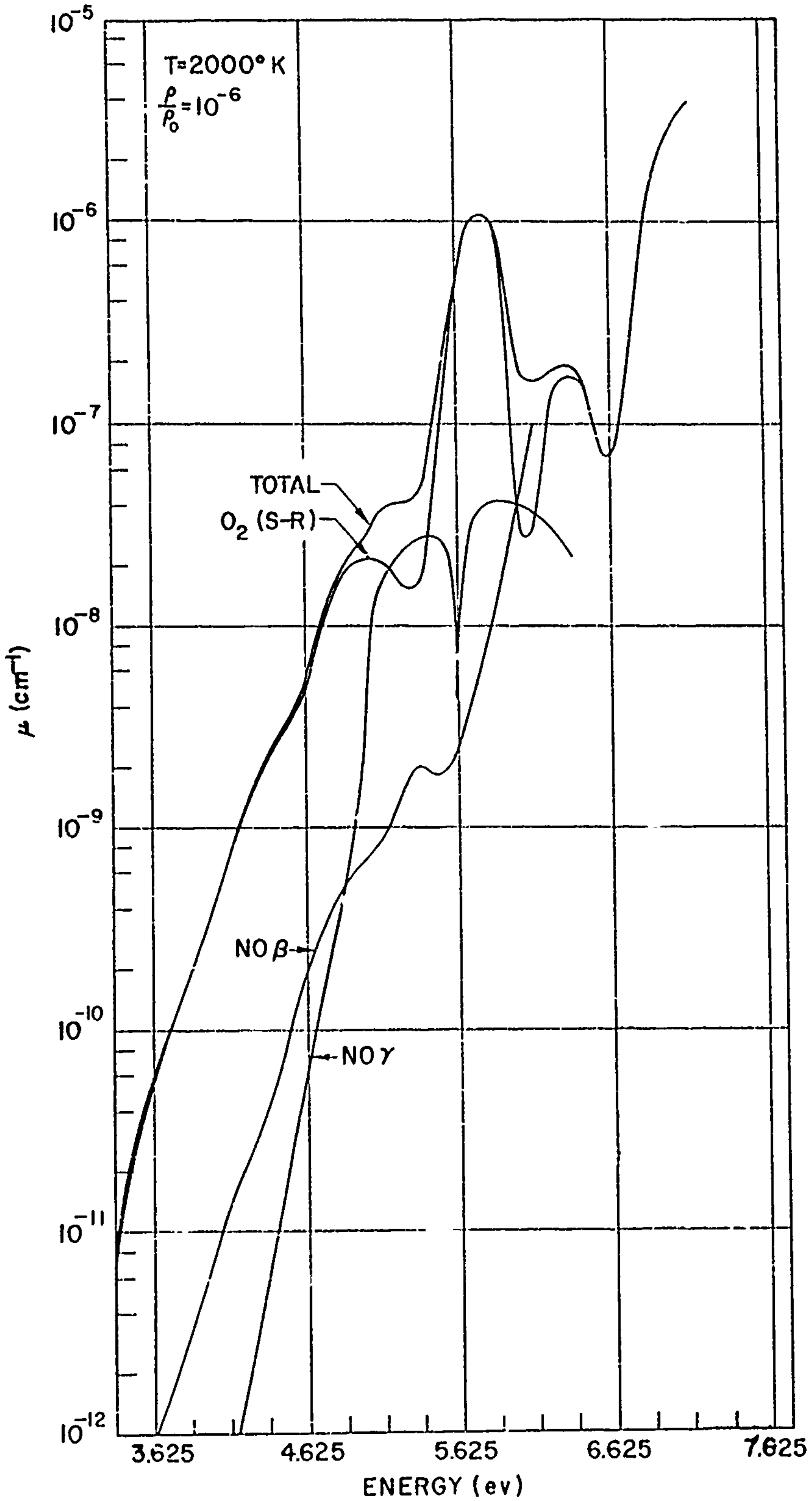

Fig. 2 Absorption Coefficient vs Photon Energy: T = 2000°K, $\rho/\rho_o = 10^{-6}$

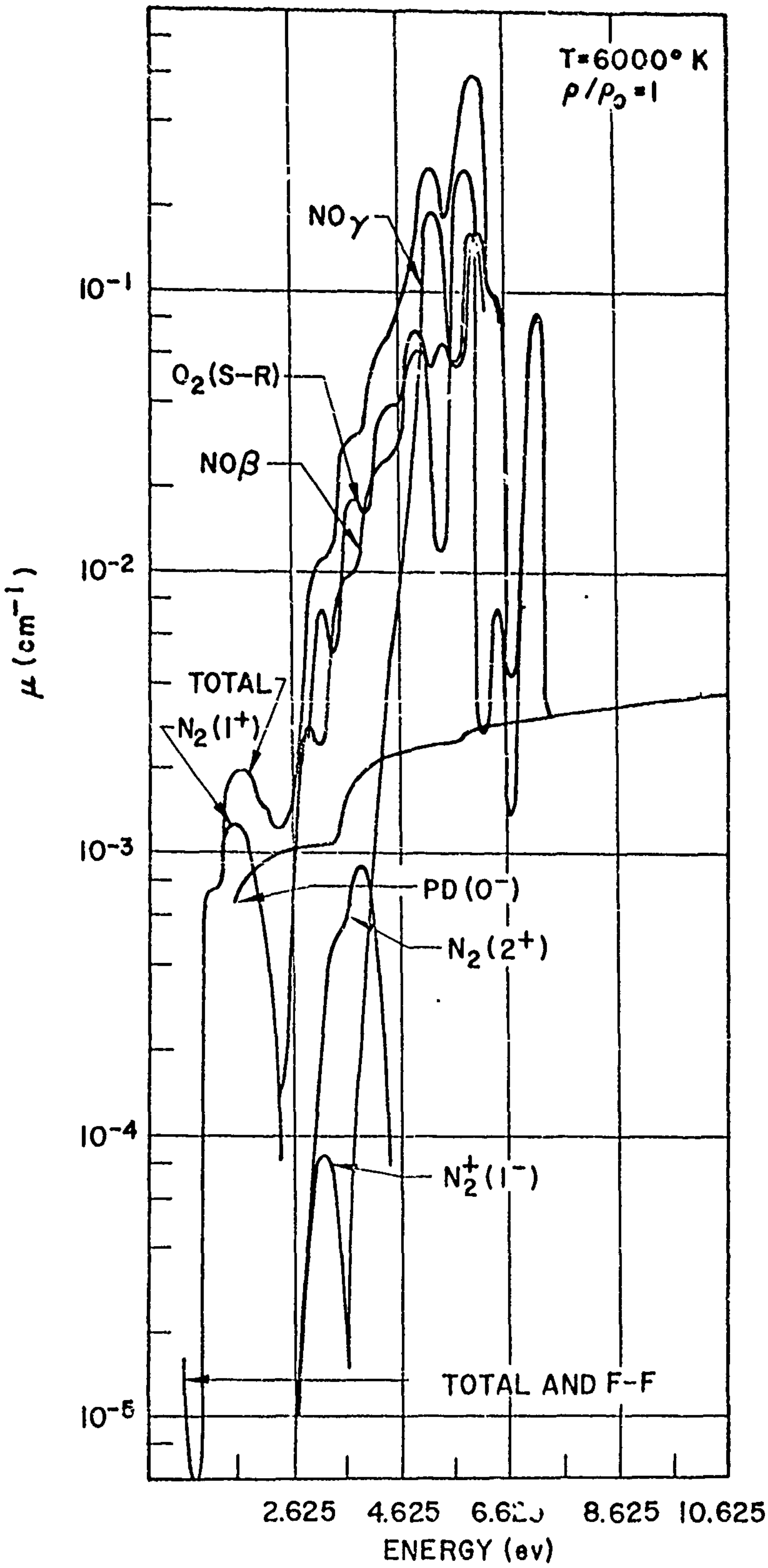

Fig. 3 Absorption Coefficient vs Photon Energy. $T = 6000^{\circ}K$, $\rho/\rho_o = 1$

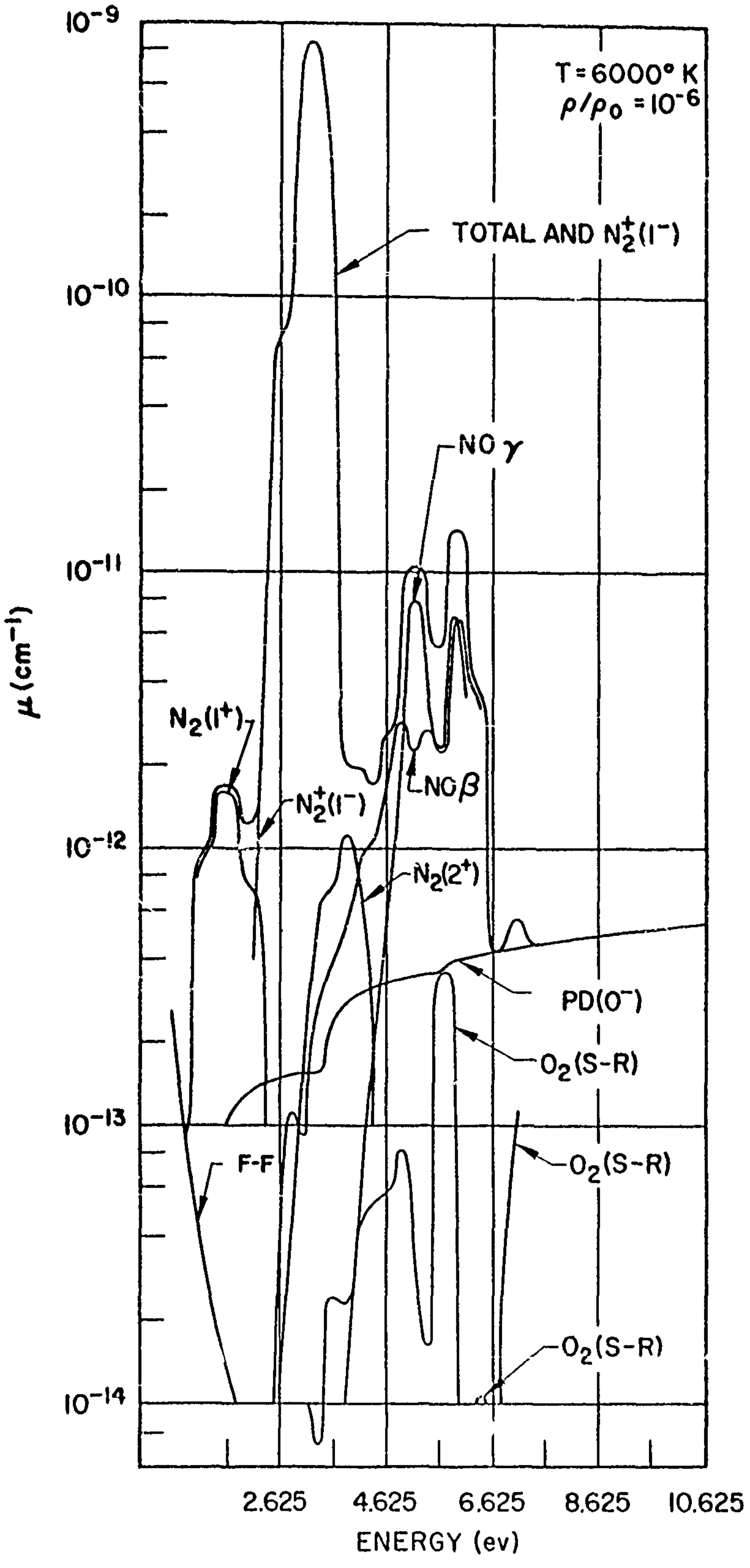

Fig. 4 Absorption Coefficient vs Photon Energy: T = 6000°K, $\rho/\rho_o = 10^{-6}$

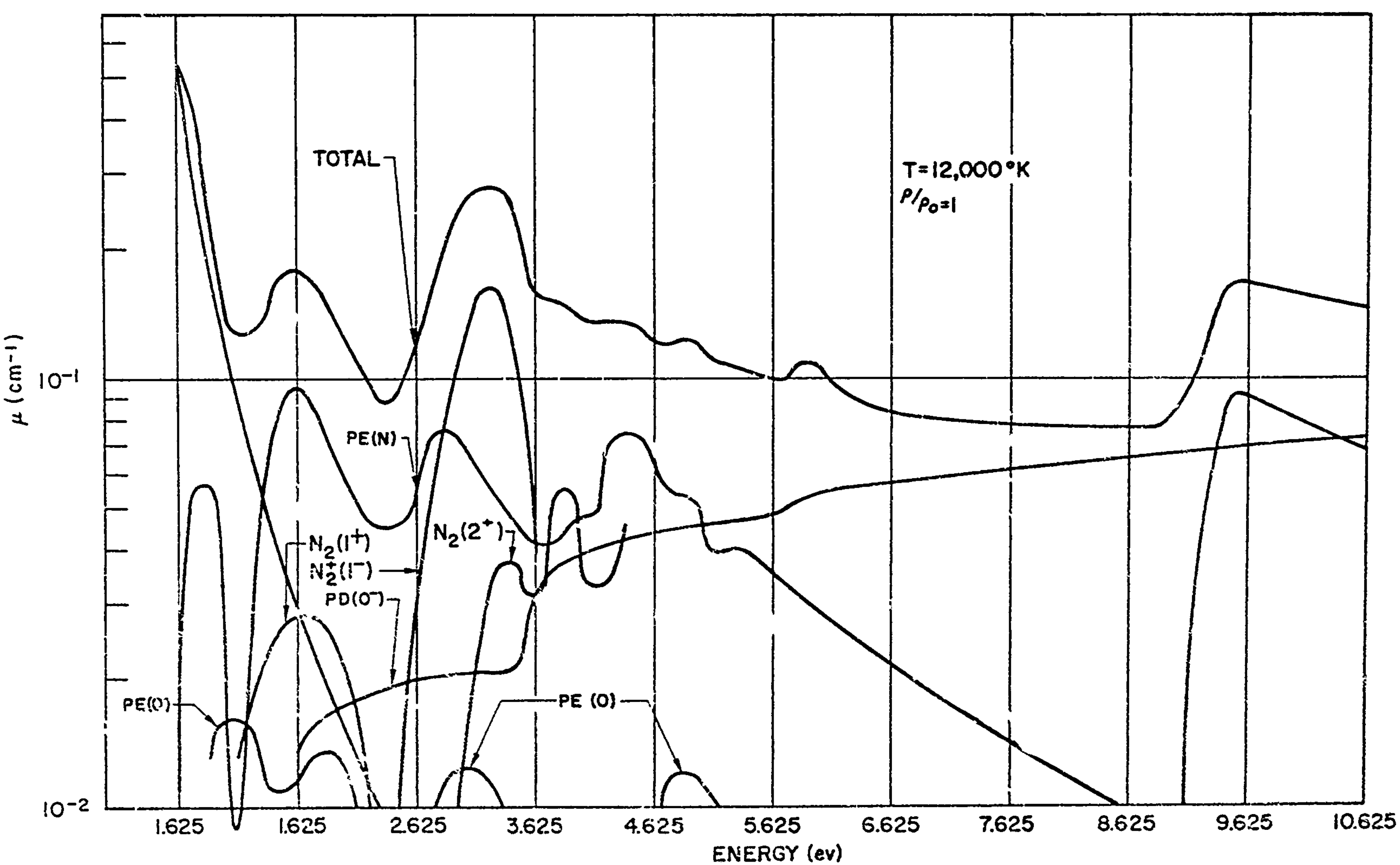

Fig. 5 Absorption Coefficient vs Photon Energy: T = 12,000°K, ρ/ρ_o = 1

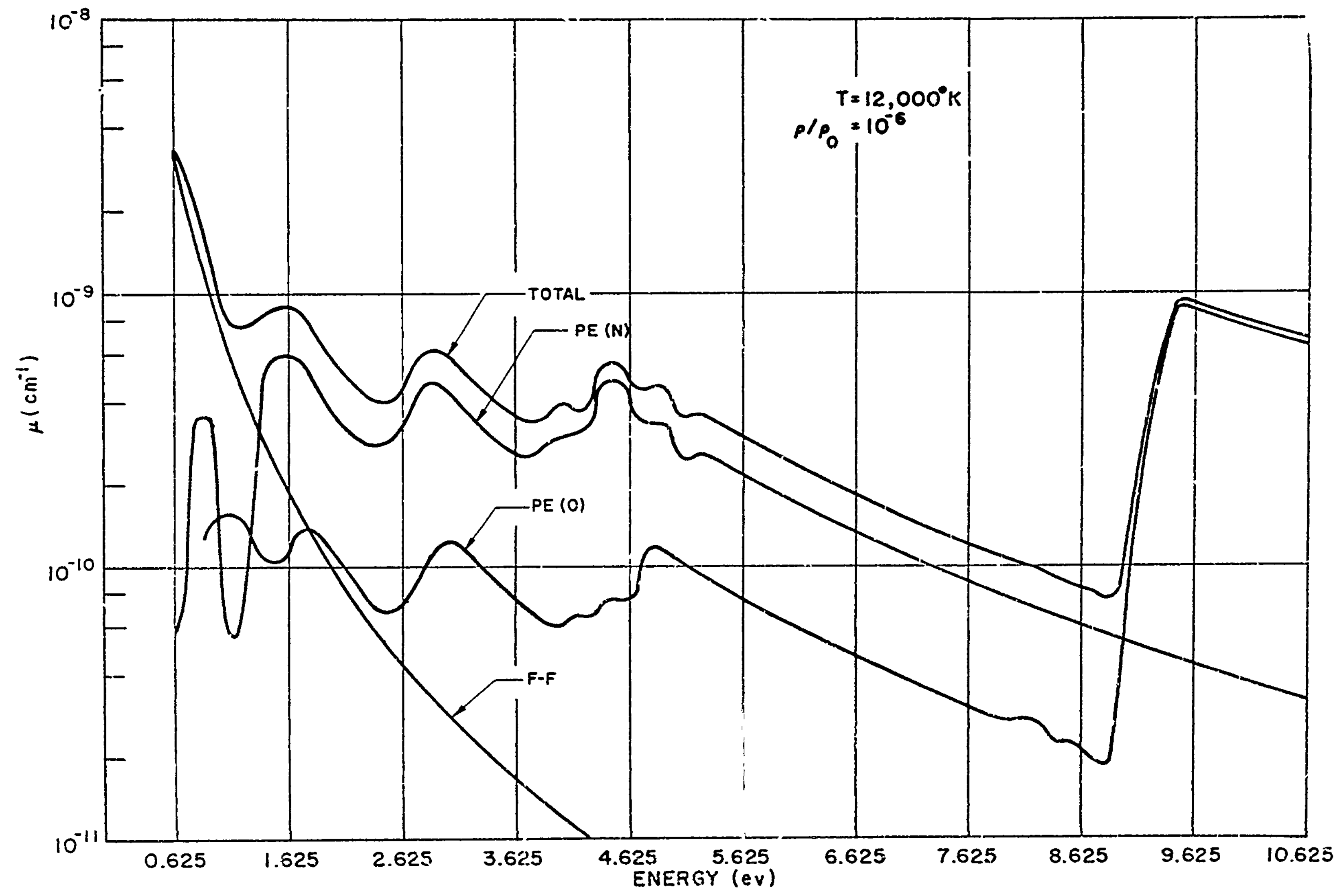

Fig. 6 Absorption Cccfficient vs Photon Energy: T = 12,000°K, $\rho/\rho_o = 10^{-6}$

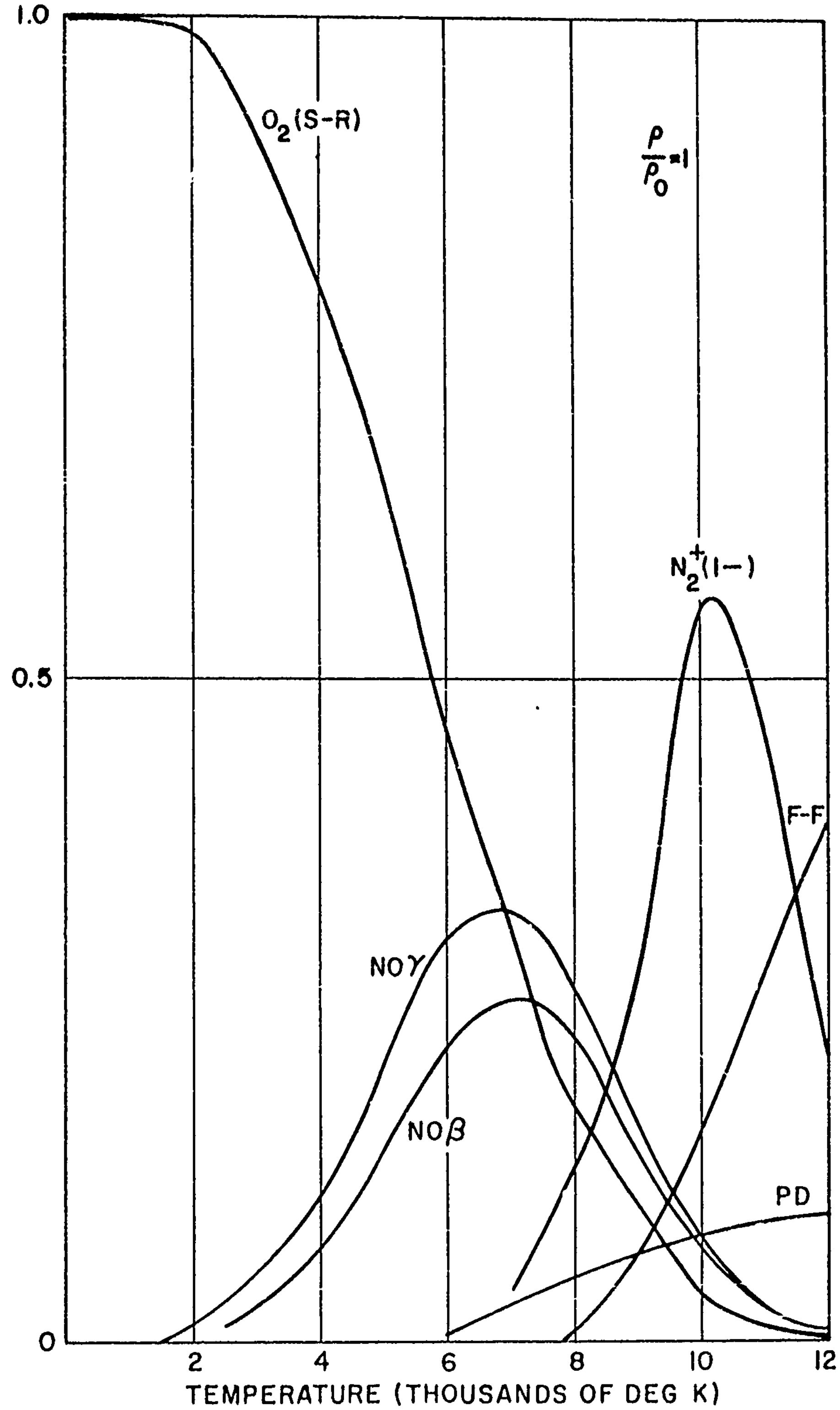

Fig. 7 Relative Contribution of Transitions: $\rho/\rho_o = 1$

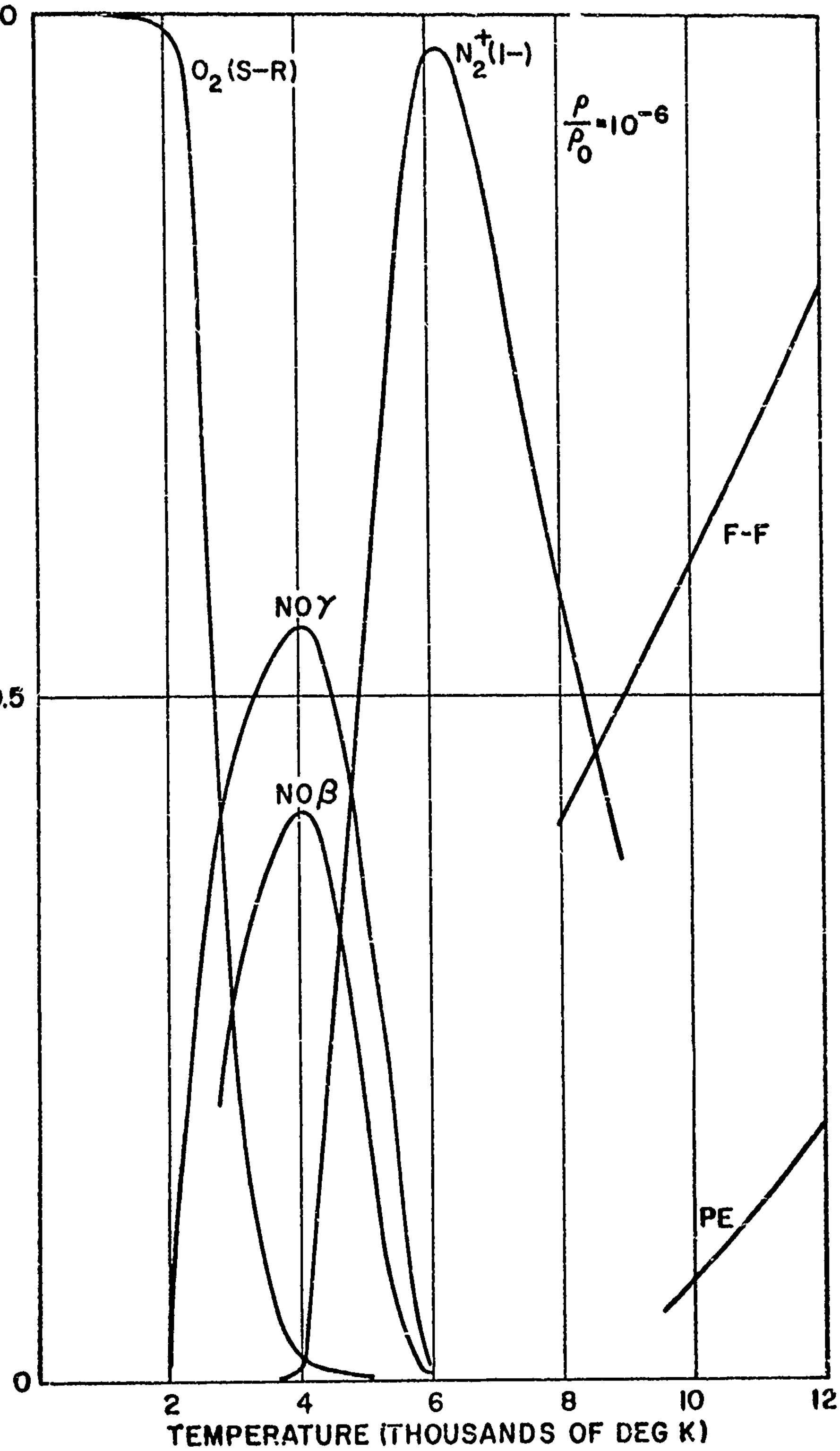

Fig. 8 Relative Contribution of Transitions: $\rho/\rho_o = 10^{-6}$

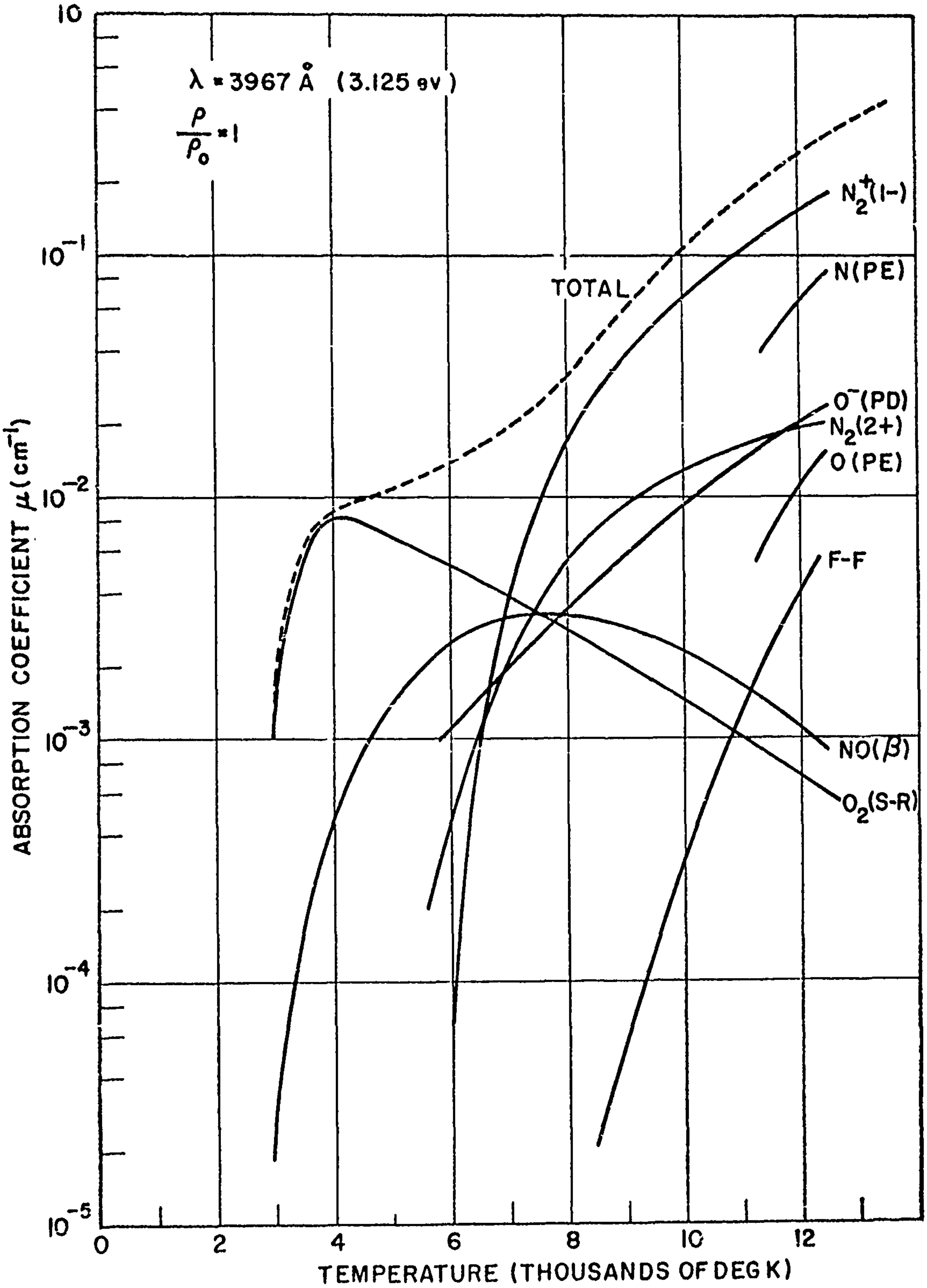

Fig. 9 Absorption Coefficient for $\lambda = 3967\text{\AA}$, $\rho/\rho_0 = 1$

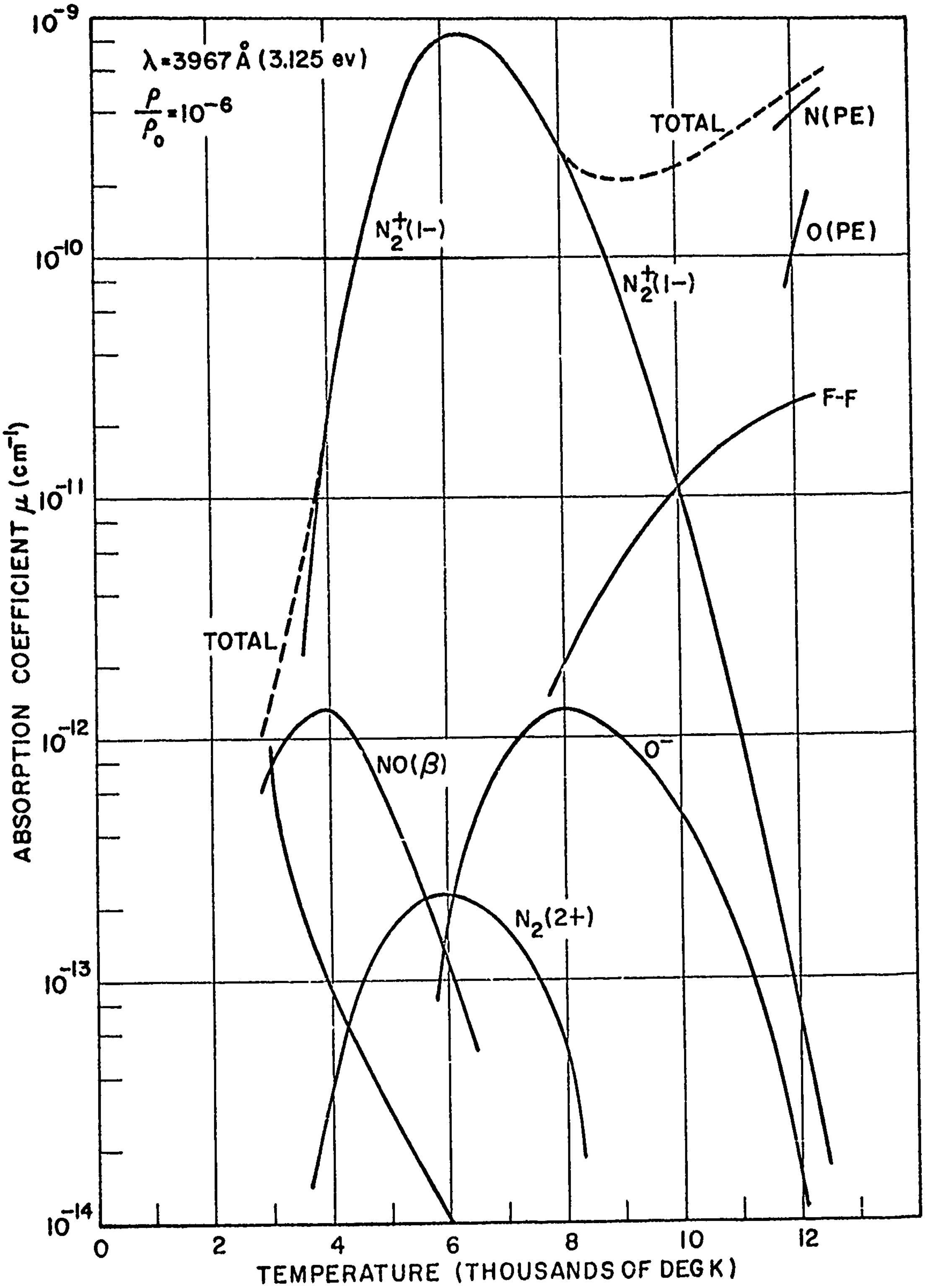

Fig. 10 Absorption Coefficient for $\lambda = 3967\mathring{A}$, $\rho/\rho_o = 10^{-6}$

4.2 LIMITATIONS OF THE TABLES

While the most significant absorbing constituents have undoubtedly been accounted for in the tables, it should not be overlooked that there will probably be some contribution in the photographic infrared from the N_2^+ Meinel band system $(X^2\Sigma \rightarrow A^2\pi)$ which overlaps the N_2 first positive system. If the gas temperature is high enough to populate the higher $B^2\Sigma$ level of N_2^+ (at 25,461.5 cm^{-1} above $X^2\Sigma$) it will certainly be high enough to excite the $A^2\pi$ level at 9168.4 cm^{-1} [Douglas (1953)]. In laboratory discharges, it is very difficult to separate this band system from the overlying N_2 first positive bands which are of great significance in the spectrum of the aurora. Data are available on the population factors N_i [Gilmore (1955)] and on the Franck-Condon factors [Fraser, Jarmain, and Nicholls (1954), Nicholls (1956, 1958b)]. However, no experimental information is available (even as an estimate) upon the effective electronic oscillator strength. In a later report we shall give the values of $N_i\, f_{LU}\, q_{v''v'}$ assuming $f_{LU} = 0.1$. Such a table can be easily modified by simple scaling when experimental values of f_{LU} become available.

4.3 EXPERIMENTAL OSCILLATOR STRENGTHS

The experimental values of most of the oscillator strengths provisionally adopted in this report are still open to question, as discussed below, but it is expected that during the next decade there should become available revised values based on lifetime measurements, which are much less open to misinterpretation than are absolute intensity measurements in emission or even absorption measurements.

Reference to Table 2 indicates that we have leaned heavily upon the experimental measurements of Keck, Camm, Kivel, and Wentink (1957, 1959) for the oscillator strengths of the N_2, N_2^+ band systems; their value for O_2 is misleading.

In their experiments, apparently sequential, photoelectric intensity measurements were made at each of a series of unspecified wavelength increments $\Delta\lambda$ over the wavelength range 2000 Å to 10,000 Å (one experiment for every increment) of the luminosity from shock-heated air, N_2, O_2, over a range of temperatures from 4000°K to 9000°K and over a range of densities from 0.01 to 10 times standard

atmospheric density. A fraction of the bands (unspecified in each case) from each system was measured, and the intensities, after subtraction of estimated contributions from O^- attachment continua, and other assumed overlapping features, were interpreted theoretically with the aid of Franck-Condon factors, and population factors, to give an effective oscillator strength for the band systems discussed. The value of this exploratory research is beyond question, but the interpretation of the measurements, which was briefly described, is open to question in a number of places.

In the case of the O_2 Schumann-Runge system, these authors studied bands in the wavelength interval 3300 Å to 4700 Å, using very approximately calculated Franck-Condon factors for the bands alone, and totally ignoring the contribution of the dissociation continuum [measured by Ditchburn and Heddle (1953, 1954)], which they could not observe. On this basis their value of 0.028 probably represents a partial contribution from the bands alone and compares plausibly with Ditchburn and Heddle's value of 0.044 for all the bands of a progression. The value 0.215 for the continuum, in our opinion still stands, and the total 0.259 for the whole transition seems realistic. We refer the reader to our remarks on the definition of f-number in Section 2.1. Keck et al in the discussion in their 1959 paper (p. 35) refer to an effective f-number of their earlier work as being associated with a limited wavelength range, and draw some comparisons with the situation for N_2 first positive which seem confused.

The claim of Keck et al (1959 p. 30) that the N_2 first positive band system represents the principal source of radiation in the wavelength interval 6,000 Å to 10,000 Å is open to serious question. The N_2 first positive system is strongly overlapped by the N_2^+ Meinel system which was undoubtedly excited in their shock tube together with the N_2^+ first negative system. The first positive system is also strongly overlapped by the CN red system $(A^2\pi - X^2\Sigma)$ [Dixon and Nicholls (1958)] which bears a relationship to the CN violet system $(B^2\Sigma - X^2\Sigma)$ comparable to the relation of the N_2^+ Meinel system to the N_2^+ first negative. CN and N_2^+ are of course isoelectronic and have a similar energy level array. Keck et al (1959) publish photographs of spectra from their shock tube which show strong impurity

bands of CN violet. The CN red system should have been excited in their shock tube, and their microphotometer trace (Fig. 10, p. 14) shows clearly, contrary to the claim made in its caption, the presence of other radiation than the N_2 first positive system. Thus their oscillator strength for the N_2 first positive bands is open to question.

The whole difficult technique of measuring oscillator strength from emission spectra of transient sources (which also requires repetitive experiments to cover the wavelength range), when the luminosity has contributions from competing radiators which strongly overlap in wavelength, should be carefully studied and compared with other techniques which, for the same amount of effort, might offer more meaningful results.

The recent claims of Erkovich (1959) should be mentioned in the case of the oscillator strengths adopted by Weber and Penner (1957) for the $NO\gamma$ system. Erkovich's work was briefly abstracted in Physics Express (Vol. 1, No. 9, Jun 1959). It involves the claim that Weber and Penner's technique was in error, reanalyzes some of the measurements of Marmo (1953) and Mayence (1952), and suggests a value of $f = 0.043$. Until Erkovich's full paper becomes available for evaluation, his comments must be borne in mind as for the moment incomplete.

In conclusion, it might be said that the usefulness of the tables in the Appendix is not greatly reduced by some ambiguity in the exact experimental values of the oscillator strengths provisionally adopted. They are, in most cases, probably correct to within an order of magnitude, and new measurements will only require simple rescaling of the tables.

We hope to refine the tables in the light of new data on f-numbers and on the photoelectric effect (Armstrong 1958). Klein and Breuckner (1958) have greatly improved the agreement between theory and experiment for the photodetachment cross section of O^-. There is a possibility of using Franck-Condon factors obtained from the numerically evaluated potentials (Jarmain 1959a, b). Some start may even be made on a theoretical estimate of oscillator strength by optimum use of high-speed digital computers.

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APPENDIX

COMPUTATIONS OF ABSORPTION OF RADIATION BY AIR

The tables in this appendix were computed for dry air in the temperature range from 1,000°K to 12,000°K. Computations were made for equal energy increments of 0.25 ev (2,016.5 cm^{-1}). The wavelength was over the range from 1,167Å to 19,837Å, and density ratios relative to sea level ρ/ρ_0, were calculated for each order of magnitude from 10 to 10^{-6}.

Table 1

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : T = 1000°K and ρ/ρ_o = 10

λ (μ)	NO β	NO γ	O_2 (S - R)	μ_{Total}	NO_2
1.9837					
1.4168					
1.1020					
0.9016					
0.7630					
0.6612					
0.5834					1.70^{-3}
0.5220					2.76^{-3}
0.4723					3.98^{3}
0.4312					4.95^{-3}
0.3967					5.66^{3}
0.3673					
0.3420					
0.3199					
0.3006					
0.2834		3.05^{-10}		3.05^{-10}	
0.2681	3.15^{-8}	1.25^{-8}		4.40^{-8}	
0.2543	1.48^{-7}	4.65^{-7}	1.46^{4}	1.47^{-4}	
0.2419	8.54^{-7}	2.17^{-4}	5.80^{-4}	7.98^{-4}	
0.2307	5.89^{-6}	1.64^{-3}	1.28^{-3}	2.93^{3}	
0.2204	9.38^{-6}	5.31^{-5}	5.19^{-2}	8.20^{-2}	
0.2110	1.51^{4}	2.45^{-3}	3.49^{-1}	3.52^{-1}	
0.2024	1.61^{-4}	2.13^{-3}	5.91^{-2}	6.14^{-2}	
0.1945		1.34^{-3}	1.03	1.03	
0.1871			1.22	1.22	
0.1803			2.56^{1}	2.56^{1}	
0.1740			6.99^{1}	6.99^{1}	
0.1681					
0.1626					
0.1574					
0.1526					
0.1480					
0.1437					
0.1397					
0.1359					
0.1322					
0.1288					
0.1255					
0.1224					
0.1195					
0.1167					

Table 2

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : T = $1000^{o}K$ and $\rho/\rho_o = 1$

λ (μ)	NO β	NO γ	O_2 (S - R)	μ_{Total}	NO_2
1.9837					
1.4168					
1.1020					
0.9016					
0.7630					
0.6612					
0.5834					5.36^{-5}
0.5220					8.74^{-5}
0.4723					1.25^{-4}
0.4312					1.56^{-4}
0.3967					1.79^{-4}
0.3673					
0.3420					
0.3199					
0.3006					
0.2834		3.05^{-11}		3.05^{-11}	
0.2681	3.15^{-9}	1.25^{-9}		4.40^{-9}	
0.2543	1.48^{-8}	4.65^{-8}	1.46^{-5}	1.47^{-5}	
0.2419	8.54^{-8}	2.17^{-5}	5.80^{-5}	7.98^{-5}	
0.2307	5.89^{-7}	1.64^{-4}	1.28^{-4}	2.93^{-4}	
0.2204	9.38^{-7}	5.31^{-6}	8.19^{-3}	8.20^{-3}	
0.2110	1.51^{-5}	2.45^{-4}	3.49^{-2}	3.52^{-2}	
0.2024	1.61^{-5}	2.13^{-4}	5.91^{-3}	6.14^{-3}	
0.1945		1.35^{-4}	1.03^{-1}	1.03^{-1}	
0.1871			1.22^{-1}	1.22^{-1}	
0.1803			2.56	2.56	
0.1740			6.99	6.99	
0.1681					
0.1626					
0.1574					
0.1526					
0.1480					
0.1437					
0.1397					
0.1359					
0.1321					
0.1288					
0.1255					
0.1224					
0.1195					
0.1167					

Table 3

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : T = 1000°K and $\rho/\rho_o = 10^{-1}$

λ (μ)	NO β	NO γ	O_2 (S - R)	μ_{Total}	NO_2
1.9837					
1.4168					
1.1020					
0 9016					
0.7630					
0.6612					
0.5834					1.70^{-6}
0.5220					2.76^{-6}
0.4723					3.98^{-6}
0.4312					4.95^{-6}
0.3967					5.66^{-6}
0.3673					
0.3420					
0 3199					
0.3006					
0 2834		3.05^{-12}		3.05^{-12}	
0.2681	3.15^{-10}	1.25^{-10}		4.40^{-10}	
0.2543	1.48^{-9}	4.65^{-9}	1.46^{-6}	1.47^{-6}	
0.2419	8.54^{-9}	2.17^{-6}	5.80^{-6}	7.98^{-6}	
0.2307	5.89^{-8}	1.64^{-5}	1.28^{-5}	2.93^{-5}	
0.2204	9.38^{-8}	5.31^{-7}	8.19^{-4}	8.20^{-4}	
0.2110	1.51^{-6}	2.45^{-5}	3.49^{-3}	3.52^{-3}	
0.2024	1.61^{-6}	2.13^{-5}	5.91^{-4}	6.14^{-4}	
0.1945		1.34^{-5}	1.03^{-2}	1.03^{-2}	
0.1871			1.22^{-2}	1.22^{-2}	
0.1803			2.56^{-1}	2.56^{-1}	
0.1740			6.99^{-1}	6.99^{-1}	
0 1681					
0.1626					
0.1574					
0.1526					
0.1480					
0.1437					
0.1397					
0.1359					
0.1322					
0.1288					
0.1255					
0.1224					
0.1195					
0.1167					

Table 4

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : T = 1000°K and $\rho/\rho_o = 10^{-2}$

λ (μ)	NO β	NO γ	O_2 (S-R)	μ_{Total}	NO_2
1.9837					
1.4161					
1.1020					
0.9016					
0.7630					
0.6612					
0.5834					5.36 $^{-8}$
0.5220					8.74 $^{-8}$
0.4723					1.25 $^{-7}$
0.4312					1.56 $^{-7}$
0.3967					1.79 $^{-7}$
0.3673					
0.3420					
0.3199					
0.3006					
0.2834		3.05 $^{-13}$		3.05 $^{-13}$	
0.2681	3.15 $^{-11}$	1.25 $^{-11}$		4.40 $^{-11}$	
0.2543	1.48 $^{-10}$	4.65 $^{-10}$	1.46 $^{-7}$	1.47 $^{-7}$	
0.2419	8.54 $^{-10}$	2.17 $^{-7}$	5.80 $^{-7}$	7.98 $^{-7}$	
0.2307	5.89 $^{-9}$	1.64 $^{-6}$	1.28 $^{-6}$	2.93 $^{-6}$	
0.2204	9.38 $^{-9}$	5.31 $^{-8}$	8.19 $^{-5}$	8.20 $^{-5}$	
0.2110	1.51 $^{-7}$	2.45 $^{-6}$	3.49 $^{-4}$	3.52 $^{-4}$	
0.2024	1.61 $^{-7}$	2.13 $^{-6}$	5.91 $^{-5}$	6.14 $^{-5}$	
0.1945		1.34 $^{-6}$	1.03 $^{-3}$	1.03 $^{-3}$	
0.1871			1.22 $^{-3}$	1.22 $^{-3}$	
0.1803			2.56 $^{-2}$	2.56 $^{-2}$	
0.1740			6.99 $^{-2}$	6.99 $^{-2}$	
0.1681					
0.1626					
0.1574					
0.1526					
0.1480					
0.1437					
0.1397					
0.1359					
0.1322					
0.1288					
0.1255					
0.1224					
0.1195					
0.1167					

Table 5

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : $T = 1000^{o}K$ and $\rho/\rho_{o} = 10^{-3}$

λ (μ)	NO β	NO γ	O_2 (S-R)	μ_{Total}	NO_2
1.9837					
1.4168					
1.1020					
0.9016					
0.7630					
0.6612					
0.5834					1.70 $^{-9}$
0.5220					2.76 $^{-9}$
0.4723					3.98 $^{-9}$
0.4312					4.95 $^{-9}$
0.3967					5.66 $^{-9}$
0.3673					
0.3420					
0.3199					
0.3006					
0.2834		3.05 $^{-14}$		3.05 $^{-14}$	
0.2681	3.15 $^{-12}$	1.25 $^{-12}$		4.40 $^{-12}$	
0.2543	1.48 $^{-11}$	4.65 $^{-11}$	1.46 $^{-8}$	1.47 $^{-8}$	
0.2419	8.54 $^{-11}$	2.17 $^{-8}$	5.80 $^{-8}$	7.98 $^{-8}$	
0.2307	5.89 $^{-10}$	1.64 $^{-7}$	1.28 $^{-7}$	2.93 $^{-7}$	
0.2204	9.38 $^{-10}$	5.31 $^{-9}$	8.19 $^{-6}$	8.20 $^{-6}$	
0.2110	1.51 $^{-8}$	2.45 $^{-7}$	3.49 $^{-5}$	3.52 $^{-5}$	
0.2024	1.61 $^{-8}$	2.13 $^{-7}$	5.91 $^{-6}$	6.14 $^{-6}$	
0.1945		1.34 $^{-7}$	1.03 $^{-4}$	1.03 $^{-4}$	
0.1871			1.22 $^{-4}$	1.22 $^{-4}$	
0.1803			2.56 $^{-3}$	2.56 $^{-3}$	
0.1740			6.99 $^{-3}$	6.99 $^{-3}$	
0.1681					
0.1626					
0.1574					
0.1526					
0.1480					
0.1437					
0.1397					
0.1359					
0.1322					
0.1288					
0.1255					
0.1224					
0.1195					
0.1167					

Table 6

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : T = 1000°K and $\rho/\rho_o = 10^{-4}$

λ (μ)	NO β	NO γ	O_2 (S-R)	μ_{Total}	NO_2
1.9837					
1.4168					
1.1020					
0.9016					
0.7630					
0.6612					
0.5834					5.36^{-11}
0.5220					8.74^{-11}
0.4723					1.25^{-10}
0.4312					1.56^{-10}
0.3967					1.79^{-10}
0.3673					
0.3420					
0.3199					
0.3006					
0.2834		3.05^{-15}		3.05^{-15}	
0.2681	3.15^{-13}	1.25^{-13}		4.40^{-13}	
0.2543	1.48^{-12}	4.65^{-12}	1.46^{-9}	1.47^{-9}	
0.2419	8.54^{-12}	2.17^{-9}	5.80^{-9}	7.98^{-9}	
0.2307	5.89^{-11}	1.64^{-8}	1.28^{-8}	2.93^{-8}	
0.2204	9.38^{-11}	5.31^{-10}	8.19^{-7}	8.20^{-7}	
0.2110	1.51^{-9}	2.45^{-8}	3.49^{-6}	3.52^{-6}	
0.2024	1.61^{-9}	2.13^{-8}	5.91^{-7}	6.14^{-7}	
0.1945		1.34^{-8}	1.03^{-5}	1.03^{-5}	
0.1871			1.22^{-5}	1.22^{-5}	
0.1803			2.56^{-4}	2.56^{-4}	
0.1740			6.99^{-4}	6.99^{-4}	
0.1681					
0.1626					
0.1574					
0.1526					
0.1480					
0.1437					
0.1397					
0.1359					
0.1322					
0.1288					
0.1255					
0.1224					
0.1195					
0.1167					

Table 7

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : $T = 1000^{o}K$ and $\rho/\rho_o = 10^{-5}$

λ (μ)	NO β	NO γ	O_2 (S-R)	μ_{Total}	NO_2
1.9837					
1.4168					
1.1020					
0.9016					
0.7630					
0.6612					
0.5834					7.39^{-13}
0.5220					1.20^{-12}
0.4723					1.73^{-12}
0.4312					2.15^{-12}
0.3967					2.46^{-12}
0.3673					
0.3420					
0.3199					
0.3006					
0.2834		3.05^{-16}		3.05^{-16}	
0.2681	3.15^{-14}	1.25^{-14}		4.40^{-14}	
0.2543	1.48^{-13}	4.65^{-13}	1.46^{-10}	1.47^{-10}	
0.2419	8.54^{-13}	2.17^{-10}	5.80^{-10}	7.98^{-10}	
0.2307	5.89^{-12}	1.64^{-9}	1.28^{-9}	2.93^{-9}	
0.2204	9.38^{-12}	5.31^{-11}	8.19^{-8}	8.20^{-8}	
0.2110	1.51^{-10}	2.45^{-9}	3.49^{-7}	3.52^{-7}	
0.2024	1.61^{-10}	2.13^{-9}	5.91^{-8}	6.14^{-8}	
0.1945		1.34^{-9}	1.03^{-6}	1.03^{-6}	
0.1871			1.22^{-6}	1.22^{-6}	
0.1803			2.56^{-5}	2.56^{-5}	
0.1740			6.99^{-5}	6.99^{-5}	
0.1681					
0.1626					
0.1574					
0.1526					
0.1480					
0.1437					
0.1397					
0.1359					
0.1322					
0.1288					
0.1255					
0.1224					
0.1195					
0.1167					

Table 8

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : T = 1000°K and $\rho/\rho_o = 10^{-6}$

λ (μ)	NO β	NO γ	O_2 (S - R)	μ_{Total}	NO_2
1.9837					
1.4168					
1.1020					
0.9016					
0.7630					
0.6612					
0.5834					2.33^{-14}
0.5220					3.80^{-14}
0.4723					5.45^{-14}
0.4312					6.80^{-14}
0.3967					7.77^{-14}
0.3673					
0.3420					
0.3199					
0.3006					
0.2834		3.05^{-17}		3.07^{-17}	
0.2681	3.15^{-15}	1.25^{-15}		4.40^{-15}	
0.2543	1.48^{-14}	4.65^{-14}	1.46^{-11}	1.47^{-11}	
0.2419	8.54^{-14}	2.17^{-11}	5.80^{-11}	7.98^{-11}	
0.2307	5.89^{-13}	1.64^{-10}	1.28^{-10}	2.93^{-10}	
0.2204	9.38^{-13}	5.31^{-12}	8.19^{-9}	8.20^{-9}	
0.2110	1.51^{-11}	2.45^{-10}	3.49^{-8}	3.52^{-8}	
0.2024	1.61^{-11}	2.13^{-10}	5.91^{-9}	6.14^{-9}	
0.1945		1.34^{-10}	1.03^{-7}	1.03^{-7}	
0.1871			1.22^{-7}	1.22^{-7}	
0.1803			2.56^{-6}	2.56^{-6}	
0.1740			$.99^{-6}$	6.99^{-6}	
0.1681					
0.1626					
0.1574					
0.1526					
0.1480					
0.1437					
0.1397					
0.1359					
0.1322					
0.1288					
0.1255					
0.1224					
0.1195					
0.1167					

Table 9

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : T = 2000°K and ρ/ρ_o = 10

λ (μ)	NO β	NO γ	O_2 (S-R)	μ_{Total}
1.9837				
1.4168				
1.1020				
0.9016				
0.7630				
0.6612				
0.5834				
0.5220				
0.4723				
0.4312				
0.3967				
0.3673	2.53^{-6}		7.79^{-5}	8.04^{-5}
0.3420	1.13^{-5}	3.68^{-8}	6.97^{-4}	7.08^{-4}
0.3199	3.86^{-5}	9.17^{-7}	2.39^{-3}	2.43^{-3}
0.3006	1.54^{-4}	9.36^{-6}	8.55^{-3}	8.71^{-3}
0.2834	4.08^{-4}	7.52^{-5}	2.70^{-2}	2.75^{-2}
0.2681	2.08^{-3}	6.46^{-4}	6.15^{-2}	6.42^{-2}
0.2543	5.66^{-3}	5.77^{-3}	2.27^{-1}	2.38^{-1}
0.2419	9.70^{-3}	1.78^{-1}	2.64^{-1}	4.52^{-1}
0.2307	2.21^{-2}	3.00^{-1}	2.08^{-1}	5.30^{-1}
0.2204	2.67^{-2}	4.69^{-2}	6.40	6.47
0.2110	1.43^{-1}	4.64^{-1}	1.11^{1}	1.17^{1}
0.2024	1.12^{-1}	4.07^{-1}	3.96^{-1}	9.15^{-1}
0.1945		2.45^{-1}	2.22	2.47
0.1871			8.93^{-1}	8.93^{-1}
0.1803			1.88^{1}	1.88^{1}
0.1740			5.13^{1}	5.13^{1}
0.1681				
0.1626				
0.1574				
0.1526				
0.1480				
0.1437				
0.1397				
0.1359				
0.1322				
0.1288				
0.1255				
0.1224				
0.1195				
0.1167				

Table 10

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : T = 2000^{o}K and ρ/ρ_o = 1

λ (μ)	NO β	NO γ	O_2 (S - R)	μ_{Total}
1.9837				
1.4168				
1.1020				
0.9016				
0.7630				
0.6612				
0.5834				
0.5220				
0.4723				
0.4312				
0.3967				
0.3673	2.53^{-7}		7.80^{-6}	8.05^{-6}
0.3420	1.13^{-6}	3.68^{-9}	6.98^{-5}	7.09^{-5}
0.3199	3.86^{-6}	9.17^{-8}	2.39^{-4}	2.43^{-4}
0.3006	1.54^{-5}	9.36^{-7}	8.56^{-4}	8.72^{-4}
0.2834	4.68^{-5}	7.52^{-6}	2.70^{-3}	2.75^{-3}
0.2681	2.08^{-4}	6.46^{-5}	6.16^{-3}	6.43^{-3}
0.2543	5.66^{-4}	5.77^{-4}	2.27^{-2}	2.38^{-2}
0.2419	9.70^{-4}	1.78^{-2}	2.64^{-2}	4.52^{-2}
0.2307	2.21^{-3}	3.00^{-2}	2.08^{-2}	5.30^{-2}
0.2204	2.67^{-3}	4.69^{-3}	6.41^{-1}	6.48^{-1}
0.2110	1.43^{-2}	4.64^{-2}	1.11	1.17
0.2024	1.12^{-2}	4.07^{-2}	3.96^{-2}	9.15^{-2}
0.1945		2.45^{-2}	2.22^{-1}	2.47^{-1}
0.1871			8.94^{-2}	8.94^{-2}
0.1803			1.88	1.88
0.1740			5.14	5.14
0.1681				
0.1626				
0.1574				
0.1520				
0.1480				
0.1437				
0.1397				
0.1359				
0.1322				
C.1288				
0.1255				
0.1224				
0.1195				
0.1167				

Table 11

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : $T = 2000^{o}K$ and $\rho/\rho_o = 10^{-1}$

λ (μ)	NO β	NO γ	O_2 (S - R)	μ_{Total}
1.9837				
1.4168				
1.1020				
0.9016				
0.7630				
0.6612				
0.5834				
0.5220				
0.4723				
0.4312				
0.3967				
0.3673	2.53^{-8}		7.79^{-7}	8.04^{-7}
0.3420	1.13^{-7}	3.68^{-10}	6.97^{-6}	7.08^{-6}
0.3199	3.86^{-7}	9.17^{-9}	2.39^{-5}	2.43^{-5}
0.3006	1.54^{-6}	9.36^{-8}	8.55^{-5}	8.71^{-5}
0.2834	4.68^{-6}	7.52^{-7}	2.70^{-4}	2.75^{-4}
0.2681	2.08^{-5}	6.46^{-6}	6.15^{-4}	6.42^{-4}
0.2543	5.66^{-5}	5.77^{-5}	2.27^{-3}	2.38^{-3}
0.2419	9.70^{-5}	1.78^{-3}	2.64^{-3}	4.52^{-3}
0.2307	2.21^{-4}	3.00^{-3}	2.08^{-3}	5.30^{-3}
0.2204	2.67^{-4}	4.69^{-4}	6.40^{-2}	6.47^{-2}
0.2110	1.43^{-3}	4.64^{-3}	1.11^{-1}	1.17^{-1}
0.2024	1.12^{-3}	4.07^{-3}	3.96^{-3}	9.15^{-3}
0.1945		2.45^{-3}	2.22^{-2}	2.47^{-2}
0.1871			8.93^{-3}	8.93^{-3}
0.1803			1.88^{-1}	1.88^{-1}
0.1740			5.13^{-1}	5.13^{-1}
0.1681				
0.1626				
0.1574				
0.1526				
0.1480				
0.1437				
0.1397				
0.1359				
0.1322				
0.1288				
0.1255				
0.1224				
0.1195				
0.1167				

Table 12

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : T = 2000°K and $\rho/\rho_o = 10^{-2}$

λ (μ)	NO β	NO γ	O_2 (S - R)	μ_{Total}
1.9837				
1.4168				
1.1020				
0.9016				
0.7630				
0.6612				
0.5834				
0.5220				
0.4723				
0.4312				
0.3967				
0.3673	2.53^{-9}		7.79^{-8}	8.04^{-8}
0.3420	1.13^{-8}	3.68^{-11}	6.97^{-7}	7.08^{-7}
0.3199	3.86^{-8}	9.17^{-10}	2.39^{-6}	2.43^{-6}
0.3006	1.54^{-7}	9.36^{-9}	8.55^{-6}	8.71^{-6}
0.2834	4.68^{-7}	7.52^{-8}	2.70^{-5}	2.75^{-5}
0.2681	2.08^{-6}	6.46^{-7}	6.15^{-5}	6.42^{-5}
0.2543	5.66^{-6}	5.77^{-6}	2.27^{-4}	2.38^{-4}
0.2419	9.70^{-6}	1.78^{-4}	2.64^{-4}	4.52^{-4}
0.2307	2.21^{-5}	3.00^{-4}	2.08^{-4}	5.30^{-4}
0.2204	2.67^{-5}	4.69^{-5}	6.40^{-3}	6.47^{-3}
0.2110	1.43^{-4}	4.64^{-4}	1.11^{-2}	1.17^{-2}
0.2024	1.12^{-4}	4.07^{-4}	3.96^{-4}	9.15^{-4}
0.1945		2.45^{-4}	2.22^{-3}	2.47^{-3}
0.1871			8.93^{-4}	8.93^{-4}
0.1803			1.88^{-2}	1.88^{-2}
0.1740			5.13^{-2}	5.13^{-2}
0.1681				
0.1626				
0.1574				
0.1526				
0.1480				
0.1437				
0.1397				
0.1359				
0.1322				
0.1288				
0.1255				
0.1224				
0.1195				
0.1167				

Table 13

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : $T = 2000^{o}K$ and $\rho/\rho_o = 10^{-3}$

λ (μ)	NO β	NO γ	O_2 (S-R)	μ_{Total}
1.9837				
1.1168				
1.10[illegible]				
0.9016				
0.7630				
0.6612				
0.5834				
0.5220				
0.4723				
0.4312				
0.3967				
0.3673	2.52^{-10}		7.73^{-9}	7.98^{-9}
0.3420	1.13^{-9}	3.67^{-12}	6.92^{-8}	7.03^{-8}
0.3199	3.85^{-9}	9.14^{-11}	2.37^{-7}	2.41^{-7}
0.3006	1.54^{-8}	9.33^{-10}	8.48^{-7}	8.64^{-7}
0.2834	4.66^{-8}	7.50^{-9}	2.68^{-6}	2.73^{-6}
0.2681	2.07^{-7}	6.44^{-8}	6.10^{-6}	6.37^{-6}
0.2543	5.64^{-7}	5.76^{-7}	2.25^{-5}	2.36^{-5}
0.2419	9.68^{-7}	1.78^{-5}	2.62^{-5}	4.50^{-5}
0.2307	2.21^{-6}	3.00^{-5}	2.06^{-5}	5.28^{-5}
0.2204	2.66^{-6}	4.68^{-6}	6.35^{-4}	6.42^{-4}
0.2110	1.43^{-5}	4.63^{-5}	1.10^{-3}	1.16^{-3}
0.2024	1.11^{-5}	4.06^{-5}	3.92^{-5}	9.09^{-5}
0.1945		2.44^{-5}	2.20^{-4}	2.44^{-4}
0.1871			8.86^{-5}	8.86^{-5}
0.1803			1.86^{-3}	1.86^{-3}
0.1740			5.09^{-3}	5.09^{-3}
0.1681				
0.1626				
0.1574				
0.1526				
0.1480				
0.1437				
0.1397				
0.1359				
0.1322				
0.1288				
0.1255				
0.1224				
0.1195				
0.1167				

Table 14

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : T = 2000°K and $\rho/\rho_o = 10^{-4}$

λ (μ)	NO β	NO γ	O_2 (S - R)	μ_{Total}
1.9837				
1.4168				
1.1020				
0.9013				
0.7630				
0.6612				
0.5834				
0.5220				
0.4723				
0.4312				
0.3967				
0.3673	2.50^{-11}		7.60^{-10}	7.85^{-10}
0.3420	1.12^{-10}	3.63^{-13}	6.80^{-9}	6.91^{-9}
0.3199	3.81^{-10}	9.05^{-12}	2.33^{-8}	2.37^{-8}
0.3006	1.52^{-9}	9.24^{-11}	8.34^{-8}	8.60^{-8}
0.2834	4.62^{-9}	7.43^{-10}	2.63^{-7}	2.68^{-7}
0.2681	2.05^{-8}	6.38^{-9}	6.00^{-7}	6.27^{-7}
0.2543	5.58^{-8}	5.70^{-8}	2.21^{-6}	2.32^{-6}
0.2419	9.58^{-8}	1.76^{-6}	2.57^{-6}	4.43^{-6}
0.2307	2.19^{-7}	2.97^{-6}	2.03^{-6}	5.22^{-6}
0.2204	2.63^{-7}	4.63^{-7}	6.24^{-5}	6.31^{-5}
0.2110	1.42^{-6}	4.58^{-6}	1.08^{-4}	1.14^{-4}
0.2024	1.10^{-6}	4.02^{-6}	3.86^{-6}	8.98^{-6}
0.1945		2.42^{-6}	2.16^{-5}	2.40^{-5}
0.1871			8.71^{-6}	8.71^{-6}
0.1803			1.83^{-4}	1.83^{-4}
0.1740			5.01	5.01^{-4}
0.1681				
0.1626				
0.1574				
0.1526				
0.1480				
0.1437				
0.1397				
0.1359				
0.1322				
0.1288				
0.1255				
0.1224				
0.1195				
0.1167				

Table 15

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : T = $2000^{o}K$ and $\rho/\rho_{o} = 10^{-5}$

λ (μ)	NO β	NO γ	O_2 (S - R)	μ_{Total}
1.9837				
1.4168				
1.1020				
0.9016				
0.7630				
0.6612				
0.5834				
0.5220				
0.4723				
0.4312				
0.3967				
0.3673	2.43^{-12}		7.18^{-11}	7.42^{-11}
0.3420	1.09^{-11}	3.53^{-14}	6.42^{-10}	6.53^{-10}
0.3199	3.71^{-11}	8.80^{-13}	2.20^{-9}	2.24^{-9}
0.3006	1.48^{-10}	8.98^{-12}	7.88^{-9}	8.04^{-9}
0.2834	4.49^{-10}	7.22^{-11}	2.48^{-8}	2.53^{-8}
0.2681	1.99^{-9}	6.20^{-10}	5.67^{-8}	5.93^{-8}
0.2543	5.43^{-9}	5.54^{-9}	2.09^{-7}	2.20^{-7}
0.2419	9.31^{-9}	1.71^{-7}	2.43^{-7}	4.23^{-7}
0.2307	2.12^{-8}	2.88^{-7}	1.91^{-7}	5.00^{-7}
0.2204	2.56^{-8}	4.50^{-8}	5.90^{-6}	5.97^{-6}
0.2110	1.38^{-7}	4.45^{-7}	1.02^{-5}	1.08^{-5}
0.2024	1.07^{-7}	3.91^{-7}	3.64^{-7}	8.62^{-7}
0.1945		2.35^{-7}	2.04^{-6}	2.28^{-6}
0.1871			8.22^{-7}	8.22^{-7}
0.1803			1.73^{-5}	1.73^{-5}
0.1740			4.73^{-5}	4.73^{-5}
0.1681				
0.1626				
0.1574				
0.1526				
0.1480				
0.1437				
0.1397				
0.1359				
0.1322				
0.1288				
0.1255				
0.1224				
0.1195				
0.1167				

Table 16

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : T = 2000°K and $\rho/\rho_o = 10^{-6}$

λ (μ)	NO β	NO γ	O_2 (S-R)	μ_{Total}
1.9837				
1.4168				
1.1020				
0.9016				
0.7630				
0.6612				
0.5834				
0.5220				
0.4723				
0.4312				
0.3967				
0.3673	2.20^{-13}		5.98^{-12}	6.20^{-12}
0.3420	9.94^{-13}	3.23^{-15}	5.35^{-11}	5.45^{-11}
0.3199	3.39^{-12}	8.04^{-14}	1.83^{-10}	1.86^{-10}
0.3006	1.35^{-11}	8.21^{-13}	6.56^{-10}	6.70^{-10}
0.2834	4.10^{-11}	6.60^{-12}	2.07^{-9}	2.12^{-9}
0.2681	1.82^{-10}	5.66^{-11}	4.72^{-9}	4.96^{-9}
0.2543	4.96^{-10}	5.06^{-10}	1.74^{-8}	1.84^{-8}
0.2419	8.51^{-10}	1.56^{-8}	2.02^{-8}	3.67^{-8}
0.2307	1.94^{-9}	2.64^{-8}	1.59^{-8}	4.42^{-8}
0.2204	2.34^{-9}	4.11^{-9}	4.91^{-7}	4.97^{-7}
0.2110	1.26^{-8}	4.07^{-8}	8.51^{-7}	9.04^{-7}
0.2024	9.80^{-8}	3.57^{-8}	3.04^{-8}	1.64^{-7}
0.1945		2.15^{-8}	1.70^{-7}	1.92^{-7}
0.1871			6.85^{-8}	6.85^{-8}
0.1803			1.44^{-6}	1.44^{-6}
0.1740			3.94^{-6}	3.94^{-6}
0.1681				
0.1626				
0.1574				
0.1526				
0.1480				
0.1437				
0.1397				
0.1359				
0.1322				
0.1288				
0.1255				
0.1224				
0.1195				
0.1167				

Table 17

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : T = 3000^{o}K and ρ/ρ_o = 10

λ (μ)	$N_2(1^+)$	$N_2(2^+)$	$N_2^+(1^-)$	NO β	NO γ	O_2 (S-R)	μ_{Total}
1.9837							
1.4168							
1.1020	7.98^{-8}						7.98^{-8}
0.9016	1.15^{-7}						1.15^{-7}
0.7630	9.96^{-8}						9.96^{-8}
0.6612	5.36^{-8}						5.36^{-8}
0.5834	1.72^{-8}		2.86^{-17}				1.72^{-8}
0.5220	1.65^{-9}		7.85^{-16}				1.65^{-9}
0.4723		2.90^{-12}	9.49^{-15}	1.07^{-5}			1.07^{-5}
0.4312		2.12^{-11}	7.51^{-14}	1.62^{-4}		2.23^{-3}	2.39^{-3}
0.3967		2.22^{-10}	4.17^{-13}	2.50^{-4}		1.04^{-2}	1.07^{-2}
0.3673		1.08^{-9}	2.66^{-13}	1.26^{-3}		1.17^{-2}	1.30^{-2}
0.3420		2.39^{-9}	5.68^{-14}	2.47^{-3}	5.72^{-6}	6.04^{-2}	6.29^{-2}
0.3199		3.01^{-9}		5.68^{-3}	1.18^{-4}	1.10^{-1}	1.16^{-1}
0.3006		1.57^{-9}		1.50^{-2}	7.57^{-4}	2.75^{-1}	2.91^{-1}
0.2834		2.70^{-10}		2.84^{-2}	4.29^{-3}	5.63^{-1}	5.96^{-1}
0.2681				7.42^{-2}	2.21^{-2}	8.84^{-1}	9.80^{-1}
0.2543				1.61^{-1}	1.19^{-1}	2.03	2.31
0.2419				1.86^{-1}	1.45	1.57	3.21
0.2307				3.03^{-1}	1.40	8.73^{-1}	2.58
0.2204				3.15^{-1}	3.98^{-1}	2.23^{1}	2.30^{1}
0.2110				1.23	2.20	2.89^{1}	3.23^{1}
0.2024				8.00^{-1}	1.94	5.77^{-1}	3.32
0.1945					1.12	2.23	3.35
0.1871						6.23^{-1}	6.23^{-1}
0.1803						1.31^{1}	1.31^{1}
0.1740						3.57^{1}	3.57^{1}
0.1681							
0.1626							
0.1574							
0.1526							
0.1480							
0.1437							
0.1397							
0.1359							
0.1322							
0.1288							
0.1255							
0.1224							
0.1195							
0 1167							

Table 18

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : T = 3000^{o}K and ρ/ρ_o = 1

λ (μ)	$N_2(1^+)$	$N_2(2^+)$	$N_2^+(1^-)$	NO β	NO γ	O_2 (S - R)	μ_{Total}
1.9837							
1.4168							
1.1020	7.98^{-9}						7.98^{-9}
0.9016	1.15^{-8}						1.15^{-8}
0.7630	9.97^{-9}						9.97^{-9}
0.6612	5.37^{-9}						5.37^{-9}
0.5834	1.72^{-9}		4.45^{-18}				1.72^{-9}
0.5220	1.654^{-10}		1.22^{-16}				1.65^{-10}
0.4723		2.90^{-13}	1.48^{-15}	1.06^{-6}			1.06^{-6}
0.4312		2.12^{-12}	1.17^{-14}	1.60^{-5}		2.18^{-4}	2.34^{-4}
0.3967		2.22^{-11}	6.50^{-14}	2.46^{-5}		1.02^{-3}	1.04^{-3}
0.3673		1.08^{-10}	4.14^{-14}	1.24^{-4}		1.14^{-3}	1.26^{-3}
0.3420		2.39^{-10}	8.85^{-15}	2.44^{-4}	5.64^{-7}	5.90^{-3}	6.14^{-3}
0.3199		3.01^{-10}		5.60^{-4}	1.17^{-5}	1.07^{-2}	1.13^{-2}
0.3006		1.58^{-10}		1.48^{-3}	7.47^{-5}	2.69^{-2}	2.85^{-2}
0.2834		2.70^{-11}		2.80^{-3}	4.23^{-4}	5.50^{-2}	5.82^{-2}
0.2681				7.32^{-3}	2.18^{-3}	8.63^{-2}	9.58^{-2}
0.2543				1.59^{-2}	1.17^{-2}	1.98^{-1}	2.26^{-1}
0.2419				1.84^{-2}	1.43^{-1}	1.53^{-1}	3.14^{-1}
0.2307				2.99^{-2}	1.39^{-1}	8.53^{-2}	2.54^{-1}
0.2204				3.11^{-2}	3.93^{-2}	2.18	2.25
0.2110				1.22^{-1}	2.18^{-1}	2.82	3.16
0.2024				7.89^{-2}	1.91^{-1}	5.63^{-2}	3.26^{-1}
0.1945					1.11^{-1}	2.18^{-1}	3.29^{-1}
0.1871						6.08^{-2}	6.08^{-2}
0.1803						1.28	1.28
0.1740						3.49	3.49
0.1681							
0.1626							
0.1574							
0.1526							
0.1480							
0.1437							
0.1397							
0.1359							
0.1322							
0.1288							
0.1255							
0.1224							
0.1195							
0.1167							

Table 19

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : T = 3000°K and $\rho/\rho_o = 10^{-1}$

λ (μ)	$N_2(1^+)$	$N_2(2^+)$	$N_2^+(1^-)$	NO β	NO γ	O_2 (S-R)	μ_{Total}
1.9837							
1.4168							
1.1020	7.99^{-10}						7.99^{-10}
0.9016	1.15^{-9}						1.15^{-9}
0.7630	9.98^{-10}						9.98^{-10}
0.6612	5.37^{-10}						5.37^{-10}
0.5834	1.72^{-10}		1.17^{-18}				1.72^{-10}
0.5220	1.66^{-11}		3.22^{-17}				1.66^{-11}
0.4723		2.90^{-14}	3.80^{-16}	1.02^{-7}			1.02^{-7}
0.4312		2.12^{-13}	3.08^{-15}	1.54^{-6}		2.01^{-5}	2.16^{-5}
0.3967		2.22^{-12}	1.71^{-14}	2.37^{-6}		9.42^{-5}	9.66^{-5}
0.3673		1.08^{-11}	1.09^{-14}	1.19^{-5}		1.05^{-4}	1.17^{-4}
0.3420		2.39^{-11}	2.33^{-15}	2.34^{-5}	5.42^{-8}	5.45^{-4}	5.68^{-4}
0.3199		3.01^{-11}		5.38^{-5}	1.12^{-6}	9.89^{-4}	1.04^{-3}
0.3006		1.58^{-11}		1.42^{-4}	7.17^{-6}	2.49^{-3}	2.64^{-3}
0.2834		2.71^{-12}		2.69^{-4}	4.06^{-5}	5.08^{-3}	5.39^{-3}
0.2681				7.03^{-4}	2.09^{-4}	7.97^{-3}	8.88^{-3}
0.2543				1.52^{-3}	1.13^{-3}	1.83^{-2}	2.10^{-2}
0.2419				1.76^{-3}	1.37^{-2}	1.41^{-2}	2.96^{-2}
0.2307				2.87^{-3}	1.33^{-2}	7.88^{-3}	2.41^{-2}
0.2204				2.98^{-3}	3.77^{-3}	2.01^{-1}	2.08^{-1}
0.2110				1.17^{-2}	2.09^{-2}	2.61^{-1}	2.94^{-1}
0.2024				7.58^{-3}	1.83^{-2}	5.20^{-3}	3.11^{-2}
0.1945					1.07^{-2}	2.01^{-2}	3.08^{-2}
0.1871						5.62^{-3}	5.62^{-3}
0.1803						1.18^{-1}	1.18^{-1}
0.1740						3.22^{-1}	3.22^{-1}
0.1681							
0.1626							
0.1574							
0.1526							
0.1480							
0.1437							
0.1397							
0.1359							
0.1322							
0.1288							
0.1255							
0.1224							
0.1195							
0.1167							

Table 20

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : T = 3000°K and $\rho/\rho_o = 10^{-2}$

λ (μ)	$N_2(1^+)$	$N_2(2^+)$	$N_2^+(1^-)$	NO β	NO γ	O_2 (S - R)	μ_{Total}
1.9837							
1.4168							
1.1020	8.01^{-11}						8.01^{-11}
0.9016	1.16^{-10}						1.16^{-10}
0.7630	1.00^{-10}						1.00^{-10}
0.6612	5.38^{-11}						5.38^{-11}
0.5834	1.73^{-11}		3.83^{-19}				1.73^{-11}
0.5220	1.66^{-12}		1.05^{-17}				1.66^{-12}
0.4723		2.91^{-15}	1.27^{-16}	8.99^{-9}			8.99^{-9}
0.4312		2.13^{-14}	1.01^{-15}	1.36^{-7}		1.57^{-6}	1.71^{-6}
0.3967		2.23^{-13}	5.59^{-15}	2.09^{-7}		7.35^{-6}	7.56^{-6}
0.3673		1.09^{-12}	3.56^{-15}	1.05^{-6}		8.22^{-6}	9.27^{-6}
0.3420		2.40^{-12}	7.61^{-16}	2.07^{-6}	4.79^{-9}	4.25^{-5}	4.46^{-5}
0.3199		3.02^{-12}		4.76^{-6}	9.92^{-8}	7.71^{-5}	8.20^{-5}
0.3006		1.58^{-12}		1.26^{-5}	6.35^{-7}	1.94^{-4}	2.07^{-4}
0.2834		2.72^{-13}		2.38^{-5}	3.60^{-6}	3.97^{-4}	4.24^{-4}
0.2681				6.22^{-5}	1.85^{-5}	6.22^{-4}	7.03^{-4}
0.2543				1.35^{-4}	9.96^{-5}	1.43^{-3}	1.66^{-3}
0.2419				1.56^{-4}	1.21^{-3}	1.10^{-3}	2.47^{-3}
0.2307				2.54^{-4}	1.18^{-3}	6.15^{-4}	2.05^{-3}
0.2204				2.64^{-4}	3.34^{-4}	1.57^{-2}	1.63^{-2}
0.2110				1.04^{-3}	1.85^{-3}	2.03^{-2}	2.32^{-2}
0.2024				6.70^{-4}	1.62^{-3}	4.06^{-4}	2.70^{-3}
0.1945					9.43^{-4}	1.57^{-3}	2.51^{-3}
0.1871						4.38^{-4}	4.38^{-4}
0.1803						9.23^{-3}	9.23^{-3}
0.1740						2.52^{-2}	2.52^{-2}
0.1681							
0.1626							
0.1574							
0.1526							
0.1480							
0.1437							
0.1397							
0.1359							
0.1322							
0.1288							
0.1255							
0.1224							
0.1195							
0.1167							

Table 21

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : T = 3000°K and $\rho/\rho_o = 10^{-3}$

λ (μ)	$N_2(1^+)$	$N_2(2^+)$	$N_2^+(1^-)$	NO β	NO γ	O_2 (S-R)	μ_{Total}
1.9837							
1.4168							
1.1020	8.08^{-12}						8.08^{-12}
0.9016	1.16^{-11}						1.16^{-11}
0.7630	1.01^{-11}						1.01^{-11}
0.6612	5.43^{-12}						5.43^{-12}
0.5834	1.74^{-12}		1.45^{-19}				1.74^{-12}
0.5220	1.67^{-13}		3.99^{-18}				1.67^{-13}
0.4723		2.94^{-16}	4.83^{-17}	6.27^{-10}			6.27^{-10}
0.4312		2.15^{-15}	3.82^{-16}	9.49^{-9}		7.59^{-8}	8.54^{-8}
0.3967		2.24^{-14}	2.12^{-15}	1.46^{-8}		3.55^{-7}	3.70^{-7}
0.3673		1.10^{-13}	1.35^{-15}	7.35^{-8}		3.97^{-7}	4.71^{-7}
0.3420		2.42^{-13}	2.89^{-16}	1.45^{-7}	3.34^{-10}	2.05^{-6}	2.20^{-6}
0.3199		3.05^{-13}		3.32^{-7}	6.92^{-9}	3.72^{-6}	4.06^{-6}
0.3006		1.59^{-13}		8.79^{-7}	4.43^{-8}	9.36^{-6}	1.03^{-5}
0.2834		2.74^{-14}		1.66^{-6}	2.51^{-7}	1.91^{-5}	2.10^{-5}
0.2681				4.34^{-6}	1.29^{-6}	3.00^{-5}	3.56^{-5}
0.2543				9.40^{-6}	6.96^{-6}	6.89^{-5}	8.53^{-5}
0.2419				1.09^{-5}	8.47^{-5}	5.32^{-5}	1.49^{-4}
0.2307				1.77^{-5}	8.22^{-5}	2.97^{-5}	1.30^{-4}
0.2204				1.84^{-5}	2.33^{-5}	7.59^{-4}	8.01^{-4}
0.2110				7.22^{-5}	1.29^{-4}	9.81^{-4}	1.18^{-3}
0.2024				4.68^{-5}	1.13^{-4}	1.96^{-5}	1.79^{-4}
0.1945					6.58^{-5}	7.59^{-5}	1.42^{-4}
0.1871						2.12^{-5}	2.12^{-5}
0.1803						4.45^{-4}	4.45^{-4}
0.1740						1.21^{-3}	1.21^{-3}
0.1681							
0.1626							
0.1574							
0.1526							
0.1480							
0.1437							
0.1397							
0.1359							
0.1322							
0.1288							
0.1255							
0.1224							
0.1195							
0.1167							

Table 22

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : T = 3000°K and $\rho/\rho_o = 10^{-4}$

λ (μ)	$N_2(1^+)$	$N_2(2^+)$	$N_2^+(1^-)$	NO β	NO γ	O_2 (S-R)	μ_{Total}
1.9837							
1.4168							
1.1020	8.15^{-13}						8.15^{-13}
0.9016	1.18^{-12}						1.18^{-12}
0.7630	1.02^{-12}						1.02^{-12}
0.6612	5.48^{-13}						5.48^{-13}
0.5834	1.75^{-13}		6.89^{-20}				1.75^{-13}
0.5220	1.69^{-14}		1.89^{-18}				1.69^{-14}
0.4723		2.96^{-17}	2.29^{-17}	2.84^{-11}			2.84^{-11}
0.4312		2.17^{-16}	1.81^{-16}	4.30^{-10}		1.54^{-9}	1.97^{-9}
0.3967		2.26^{-15}	1.00^{-15}	6.62^{-10}		7.22^{-9}	7.88^{-9}
0.3673		1.10^{-14}	6.41^{-16}	3.33^{-9}		8.07^{-9}	1.14^{-8}
0.3420		2.44^{-14}	1.37^{-16}	6.56^{-9}	1.51^{-11}	4.18^{-8}	4.84^{-8}
0.3199		3.07^{-14}		1.50^{-8}	3.14^{-10}	7.58^{-8}	9.11^{-8}
0.3006		1.61^{-14}		3.98^{-8}	2.01^{-9}	1.90^{-7}	2.32^{-7}
0.2834		2.76^{-15}		7.53^{-8}	1.14^{-8}	3.89^{-7}	4.76^{-7}
0.2681				1.97^{-7}	5.85^{-8}	6.11^{-7}	8.67^{-7}
0.2543				4.26^{-7}	3.15^{-7}	1.40^{-6}	2.14^{-6}
0.2419				4.93^{-7}	3.84^{-6}	1.08^{-6}	5.41^{-6}
0.2307				8.03^{-7}	3.72^{-6}	6.04^{-7}	5.13^{-6}
0.2204				8.35^{-7}	1.06^{-6}	1.54^{-5}	1.73^{-5}
0.2110				3.27^{-6}	5.84^{-6}	2.00^{-5}	2.91^{-5}
0.2024				2.12^{-6}	5.13^{-6}	3.99^{-7}	7.65^{-6}
0.1945					2.98^{-6}	1.54^{-6}	4.52^{-6}
0.1871						4.30^{-7}	4.30^{-7}
0.1803						9.06^{-6}	9.06^{-6}
0.1740						2.47^{-5}	2.47^{-5}
0.1681							
0.1626							
0.1574							
0.1526							
0.1480							
0.1437							
0.1397							
0.1359							
0.1322							
0.1288							
0.1255							
0.1224							
0.1195							
0.1167							

Table 23

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : T = 3000°K and $\rho/\rho_o = 10^{-5}$

λ (μ)	$N_2(1^+)$	$N_2(2^+)$	$N_2^+(1^-)$	NO β	NO γ	O_2 (S-R)	μ_{Total}
1.9837							
1.4168							
1.1020	8.19^{-14}						8.19^{-14}
0.9016	1.18^{-13}						1.18^{-13}
0.7630	1.02^{-13}						1.02^{-13}
0.6612	5.51^{-14}						5.51^{-14}
0.5834	1.76^{-14}		3.74^{-20}				1.76^{-14}
0.5220	1.70^{-15}		1.03^{-18}				1.70^{-15}
0.4723		2.98^{-18}	1.24^{-17}	9.74^{-13}			9.74^{-13}
0.4312		2.18^{-17}	9.82^{-17}	1.47^{-11}		1.80^{-11}	3.27^{-11}
0.3967		2.28^{-16}	5.46^{-16}	2.27^{-11}		8.42^{-11}	1.07^{-10}
0.3673		1.11^{-15}	3.48^{-16}	1.14^{-10}		9.41^{-11}	2.08^{-10}
0.3420		2.45^{-15}	7.43^{-17}	2.25^{-10}	5.19^{-13}	4.87^{-10}	7.13^{-10}
0.3199		3.09^{-15}		5.16^{-10}	1.08^{-11}	8.83^{-10}	1.41^{-9}
0.3006		1.62^{-15}		1.36^{-9}	6.88^{-11}	2.22^{-9}	3.65^{-9}
0.2834		2.78^{-16}		2.58^{-9}	3.90^{-10}	4.54^{-9}	7.51^{-9}
0.2681				6.74^{-9}	2.00^{-9}	7.12^{-9}	1.59^{-8}
0.2543				1.46^{-8}	1.08^{-8}	1.63^{-8}	4.17^{-8}
0.2419				1.69^{-8}	1.32^{-7}	1.26^{-8}	1.62^{-7}
0.2307				2.75^{-8}	1.28^{-7}	7.04^{-9}	1.63^{-7}
0.2204				2.86^{-8}	3.62^{-8}	1.80^{-7}	2.45^{-7}
0.2110				1.12^{-7}	2.30^{-7}	2.33^{-7}	5.45^{-7}
0.2024				7.26^{-8}	1.76^{-7}	4.64^{-9}	2.53^{-7}
0.1945					1.02^{-7}	1.80^{-8}	1.20^{-7}
0.1871						5.02^{-9}	5.02^{-9}
0.1803						1.06^{-7}	1.06^{-7}
0.1740						2.88^{-7}	2.88^{-7}
0.1681							
0.1626							
0.1574							
0.1526							
0.1480							
0.1437							
0.1397							
0.1359							
0.1322							
0.1288							
0.1255							
0.1224							
0.1195							
0.1167							

Table 24

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : T = 3000°K and $\rho/\rho_0 = 10^{-6}$

λ (μ)	$N_2(1^+)$	$N_2(2^+)$	$N_2^+(1^-)$	NO β	NO γ	O_2 (S-R)	μ_{Total}
1.9837							
1.4168							
1.1020	8.19^{-15}						8.19^{-15}
0.9016	1.18^{-14}						1.18^{-14}
0.7630	1.02^{-14}						1.02^{-14}
0.6612	5.51^{-15}						5.51^{-15}
0.5834	1.76^{-15}		2.08^{-20}				1.76^{-15}
0.5220	1.70^{-16}		5.72^{-19}				1.71^{-16}
0.4723		2.98^{-19}	6.92^{-18}	3.12^{-14}			3.12^{-14}
0.4312		2.18^{-18}	5.47^{-17}	4.72^{-13}		1.85^{-13}	6.57^{-13}
0.3967		2.28^{-17}	3.04^{-16}	7.26^{-13}		8.64^{-13}	1.59^{-12}
0.3673		1.11^{-16}	1.94^{-16}	3.65^{-12}		9.66^{-13}	4.62^{-12}
0.3420		2.45^{-16}	4.14^{-17}	7.19^{-12}	1.66^{-14}	5.00^{-12}	1.22^{-11}
0.3199		3.09^{-16}		1.65^{-11}	3.44^{-13}	9.07^{-12}	2.59^{-11}
0.3006		1.62^{-16}		4.37^{-11}	2.20^{-12}	2.28^{-11}	6.87^{-11}
0.2834		2.78^{-17}		8.27^{-11}	1.25^{-11}	4.66^{-11}	1.42^{-10}
0.2681				2.16^{-10}	6.42^{-11}	7.31^{-11}	3.53^{-10}
0.2543				4.67^{-10}	3.46^{-10}	1.68^{-10}	9.81^{-10}
0.2419				5.41^{-10}	4.21^{-9}	1.30^{-10}	4.88^{-9}
0.2307				8.81^{-10}	4.09^{-9}	7.23^{-11}	5.04^{-9}
0.2204				9.16^{-10}	1.16^{-9}	1.85^{-9}	3.93^{-9}
0.2110				3.59^{-9}	6.41^{-9}	2.39^{-9}	1.24^{-8}
0.2024				2.33^{-9}	5.53^{-9}	4.77^{-11}	8.01^{-9}
0.1945					3.27^{-9}	1.85^{-10}	3.46^{-9}
0.1871						5.15^{-11}	5.15^{-11}
0.1803						1.08^{-9}	1.08^{-9}
0.1740						2.96^{-9}	2.96^{-9}
0.1681							
0.1626							
0.1574							
0.1526							
0.1480							
0.1437							
0.1397							
0.1359							
0.1322							
0.1288							
0.1255							
0.1224							
0.1195							
0.1167							

Table 25

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : T = 4000^{o}K and ρ/ρ_o = 10

λ (μ)	$N_2(1^+)$	$N_2(2^+)$	$N_2^+(1^-)$	NO β	NO γ	O_2 (S-R)	μ_{Total}
1.9837							
1.4168							
1.1020	2.84^{-5}						2.45^{-5}
0.9016	4.19^{-5}						4.19^{-5}
0.7630	3.75^{-5}						3.75^{-5}
0.6612	2.26^{-5}						2.26^{-5}
0.5834	8.26^{-6}		1.27^{-12}				8.26^{-6}
0.5220	1.14^{-6}		3.12^{-11}	1.05^{-4}			1.06^{-4}
0.4723		1.18^{-8}	3.10^{-10}	5.92^{-4}			5.92^{-4}
0.4312		5.24^{-8}	1.78^{-9}	4.36^{-3}		3.12^{2}	3.56^{-2}
0.3967		4.36^{-7}	7.00^{-9}	5.10^{-3}		1.11^{-1}	1.16^{-1}
0.3673		1.64^{-6}	4.98^{-9}	1.89^{-2}		9.96^{-2}	1.19^{-1}
0.3420		2.70^{-6}	1.15^{-9}	3.25^{-2}	5.97^{-5}	4.16^{-1}	4.49^{-1}
0.3199		3.71^{-6}		5.61^{-2}	1.13^{-3}	5.51^{-1}	6.08^{-1}
0.3006		2.05^{-6}		1.20^{-1}	5.70^{-3}	1.16	1.29
0.2834		3.38^{-7}		1.78^{-1}	2.75^{-2}	1.90	2.11
0.2681				3.62^{-1}	1.07^{-1}	2.48	2.95
0.2543				6.99^{-1}	4.47^{-1}	4.46	5.61
0.2419				6.64^{-1}	3.40	2.78	6.84
0.2307				9.17^{-1}	2.49	1.31	4.72
0.2204				8.79^{-1}	9.59^{-1}	3.07^{1}	3.25^{1}
0.2110				2.968	3.90	3.44^{1}	4.13^{1}
0.2024				1.72	3.42	5.06^{-1}	5.65
0.1945					1.93	1.63	3.56
0.1871						3.79^{-1}	3.79^{-1}
0.1803						7.97	7.97
0.1740						2.19^{1}	2.19^{1}
0.1681							
0.1626							
0.1574							
0.1526							
0.1480							
0.1437							
0.1397							
0.1359							
0.1322							
0.1288							
0.1255							
0.1224							
0.1195							
0.1167							

Table 26

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : $T = 4000^{o}K$ and $\rho/\rho_o = 1$

λ (μ)	$N_2(1^+)$	$N_2(2^+)$	$N_2^+(1^-)$	NO β	NO γ	O_2 (S-R)	μ_{Total}
1.9837							
1.4168							
1.1020	2.86^{-6}						2.86^{-6}
0.9016	4.23^{-6}						4.23^{-6}
0.7630	3.78^{-6}						3.78^{-6}
0.6612	2.27^{-6}						2.27^{-6}
0.5834	8.32^{-7}		3.02^{-13}				8.32^{-7}
0.5220	1.15^{-7}		7.40^{-12}	9.17^{-6}			9.29^{-6}
0.4723		1.19^{-9}	7.35^{-11}	5.18^{-5}			5.18^{-5}
0.4312		5.28^{-9}	4.23^{-10}	3.82^{-4}		2.37^{-3}	2.75^{-3}
0.3967		4.40^{-8}	1.66^{-9}	4.46^{-4}		8.44^{-3}	8.89^{-3}
0.3673		1.66^{-7}	1.18^{-9}	1.66^{-3}		7.56^{-3}	9.22^{-3}
0.3420		2.72^{-7}	2.73^{-10}	2.85^{-3}	5.22^{-6}	3.16^{-2}	3.45^{-2}
0.3199		3.40^{-7}		4.91^{-3}	9.89^{-5}	4.18^{-2}	4.68^{-2}
0.3006		2.07^{-7}		1.05^{-2}	4.99^{-4}	8.78^{-2}	9.88^{-2}
0.2834		3.41^{-8}		1.56^{-2}	2.40^{-3}	1.44^{-1}	1.62^{-1}
0.2681				3.17^{-2}	9.39^{-3}	1.88^{-1}	2.29^{-1}
0.2543				6.12^{-2}	3.91^{-2}	3.39^{-1}	4.39^{-1}
0.2419				5.81^{-2}	2.98^{-1}	2.11^{-1}	5.67^{-1}
0.2307				8.02^{-2}	2.18^{-1}	9.96^{-2}	3.98^{-1}
0.2204				7.69^{-2}	8.39^{-2}	2.33	2.49
0.2110				2.60^{-1}	3.41^{-1}	2.61	3.21
0.2024				1.51^{-1}	2.99^{-1}	3.84^{-2}	4.88^{-1}
0.1945					1.69^{-1}	1.24^{-1}	2.93^{-1}
0.1871						2.88^{-2}	2.88^{-2}
0.1803						6.05^{-1}	6.05^{-1}
0.1740						1.66	1.66
0.1681							
0.1626							
0.1574							
0.1526							
0.1480							
0.1437							
0.1397							
0.1359							
0.1322							
0.1288							
0.1255							
0.1224							
0.1195							
0.1167							

Table 27

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : $T = 4000^{o}K$ and $\rho/\rho_{o} = 10^{-1}$

λ (μ)	$N_2(1^+)$	$N_2(2^+)$	$N_2^+(1^-)$	NO β	NO γ	O_2 (S - R)	μ_{Total}
1.9837							
1.4168							
1.1020	2.91^{-7}						2.91^{-7}
0.9016	4.30^{-7}						4.30^{-7}
0.7630	3.85^{-7}						3.85^{-7}
0.6612	2.32^{-7}						2.32^{-7}
0.5834	8.47^{-8}		1.09^{-13}				8.47^{-8}
0.5220	1.17^{-8}		2.67^{-12}	6.24^{-7}			6.36^{-7}
0.4723		1.21^{-10}	2.65^{-11}	3.52^{-6}			3.52^{-6}
0.4312		5.37^{-10}	1.53^{-10}	2.60^{-5}		1.08^{-4}	1.34^{-4}
0.3967		4.48^{-9}	5.99^{-10}	3.04^{-5}		3.85^{-4}	4.15^{-4}
0.3673		1.68^{-8}	4.26^{-10}	1.13^{-4}		3.45^{-4}	4.58^{-4}
0.3420		2.77^{-8}	9.86^{-11}	1.94^{-4}	3.55^{-7}	1.44^{-3}	1.63^{-3}
0.3199		3.81^{-8}		3.34^{-4}	6.73^{-6}	1.91^{-3}	2.25^{-3}
0.3006		2.11^{-8}		7.15^{-4}	3.39^{-5}	4.00^{-3}	4.75^{-3}
0.2834		3.47^{-7}		1.06^{-3}	1.64^{-4}	6.57^{-3}	7.79^{-3}
0.2681				2.16^{-3}	6.39^{-4}	8.57^{-3}	1.14 [illegible]
0.2543				4.16^{-3}	2.66^{-3}	1.55^{-2}	2.23^{-2}
0.2419				3.05^{-3}	2.02^{-2}	9.62^{-3}	3.38^{-2}
0.2307				5.46^{-3}	1.48^{-2}	4.54^{-3}	2.48^{-2}
0.2204				5.23^{-3}	5.71^{-3}	1.06^{-1}	1.17^{-1}
0.2110				1.77^{-2}	2.32^{-2}	1.19^{-1}	1.60^{-1}
0.2024				1.02^{-2}	2.03^{-2}	1.75^{-3}	3.23^{-2}
0.1945					1.15^{-2}	5.65^{-3}	1.72^{-2}
0.1871						1.31^{-3}	1.31^{-3}
0.1803						2.76^{-2}	2.76^{-2}
0.1740						7.57^{-2}	7.57^{-2}
0.1681							
0.1626							
0.1574							
0.1526							
0.1480							
0.1437							
0.1397							
0.1359							
0.1322							
0.1288							
0.1255							
0.1224							
0.1195							
0.1167							

Table 28

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : T = 4000°K and $\rho/\rho_0 = 10^{-2}$

λ (μ)	$N_2(1^+)$	$N_2(2^+)$	$N_2^+(1^-)$	NO β	NO γ	O_2(S-R)	μ_{Total}
1.9837							
1.4168							
1.1020	2.97^{-8}						2.97^{-8}
0.9016	4.36^{-8}						4.38^{-8}
0.7630	3.92^{-8}						3.92^{-8}
0.6612	2.36^{-8}						2.36^{-8}
0.5834	8.63^{-9}		5.18^{-14}				8.63^{-9}
0.5220	1.20^{-9}		1.27^{-12}	2.80^{-8}			2.92^{-8}
0.4723		1.23^{-11}	1.26^{-11}	1.58^{-7}			1.58^{-7}
0.4312		5.47^{-11}	7.26^{-11}	1.16^{-6}		2.13^{-6}	3.29^{-6}
0.3967		4.56^{-10}	2.85^{-10}	1.36^{-6}		7.58^{-6}	8.94^{-6}
0.3673		1.72^{-9}	2.03^{-10}	5.06^{-6}		6.79^{-6}	1.19^{-5}
0.3420		2.82^{-9}	4.69^{-11}	8.69^{-6}	1.59^{-8}	2.84^{-5}	3.72^{-5}
0.3199		3.88^{-9}		1.50^{-5}	3.02^{-7}	3.75^{-5}	5.28^{-5}
0.3006		2.15^{-9}		3.21^{-5}	1.52 [illegible]	7.88^{-5}	1.12^{-4}
0.2834		3.54^{-10}		4.76^{-5}	7.34^{-6}	1.29^{-4}	1.84^{-4}
0.2681				9.68^{-5}	2.87^{-5}	1.69^{-4}	2.95^{-4}
0.2543				1.87^{-4}	1.19^{-4}	3.04^{-4}	6.10^{-4}
0.2419				1.77^{-4}	9.09^{-4}	1.89^{-4}	1.28^{-3}
0.2307				2.45^{-4}	6.65^{-4}	8.94^{-5}	9.99^{-4}
0.2204				2.35^{-4}	2.56^{-4}	2.09^{-3}	2.58^{-3}
0.2110				7.93^{-4}	1.04^{-3}	2.34^{-3}	4.17^{-3}
0.2024				4.60^{-4}	9.13^{-4}	3.45^{-5}	1.41^{-3}
0.1945					5.16^{-4}	1.11^{-4}	6.27^{-4}
0.1871						2.59^{-5}	2.59^{-5}
0.1803						5.43^{-4}	5.43^{-4}
0.1740						1.49^{-3}	1.49^{-3}
0.1681							
0.1626							
0.1574							
0.1526							
0.1480							
0.1437							
0.1397							
0.1359							
0.1322							
0.1288							
0.1255							
0.1224							
0.1195							
0.1167							

Table 29

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : T = 4000^{o}K and $\rho/\rho_o = 10^{-3}$

λ (μ)	$N_2(1^+)$	$N_2(2^+)$	$N_2^+(1^-)$	NO β	NO γ	O_2(S-R)	μ_{Total}
1.9837							
1.4168							
1.1020	2.98^{-9}						2.98^{-9}
0.9016	4.40^{-9}						4.40^{-9}
0.7630	3.94^{-9}						3.94^{-9}
0.6612	2.37^{-9}						2.37^{-9}
0.5834	8.67^{-10}		2.79^{-14}				8.67^{-10}
0.5220	1.20^{-10}		6.85^{-13}	9.67^{-10}			1.09^{-9}
0.4723		1.24^{-12}	6.81^{-12}	5.46^{-9}			5.47^{-9}
0.4312		5.50^{-12}	3.92^{-11}	4.02^{-8}		2.53^{-8}	6.55^{-8}
0.3967		4.58^{-11}	1.54^{-10}	4.71^{-8}		9.00^{-8}	1.37^{-7}
0.3673		1.72^{-10}	1.09^{-10}	1.75^{-7}		8.06^{-8}	2.56^{-7}
0.3420		2.84^{-10}	2.53^{-11}	3.00^{-7}	5.51^{-10}	3.37^{-7}	6.38^{-7}
0.3199		3.90^{-10}		5.18^{-7}	1.04^{-8}	4.46^{-7}	9.75^{-7}
0.3006		2.16^{-10}		1.11^{-6}	5.26^{-8}	9.36^{-7}	2.10^{-6}
0.2834		3.55^{-11}		1.64^{-6}	2.54^{-7}	1.54^{-6}	3.43^{-6}
0.2681				3.34^{-6}	9.91^{-7}	2.00^{-6}	6.33^{-6}
0.2543				6.45^{-6}	4.12^{-6}	3.61^{-6}	1.42^{-5}
0.2419				6.12^{-6}	3.14^{-5}	2.25^{-6}	3.98^{-5}
0.2307				8.46^{-6}	2.30^{-5}	1.06^{-6}	3.25^{-5}
0.2204				8.11^{-6}	8.85^{-6}	2.48^{-5}	4.18^{-5}
0.2110				2.74^{-5}	3.60^{-5}	2.78^{-5}	9.12^{-5}
0.2024				1.59^{-5}	3.15^{-5}	4.09^{-7}	4.78^{-5}
0.1945					1.78^{-5}	1.32^{-6}	1.91^{-5}
0.1871						3.07^{-7}	3.07^{-7}
0.1803						6.45^{-6}	6.45^{-6}
0.1740						1.77^{-5}	1.77^{-5}
0.1681							
0.1626							
0.1574							
0.1526							
0.1480							
0.1437							
0.1397							
0.1359							
0.1322							
0.1288							
0.1255							
0.1224							
0.1195							
0.1167							

Table 30

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : $T = 4000^{\circ}K$ and $\rho/\rho_o = 10^{-4}$

λ (μ)	$N_2(1^+)$	$N_2(2^+)$	$N_2^+(1^-)$	NO β	NO γ	O_2 (S - R)	μ_{Total}
1.9837							
1.4168							
1.1020	2.94^{-10}						2.94^{-10}
0.9016	4.34^{-10}						4.34^{-10}
0.7630	3.89^{-10}						3.89^{-10}
0.6612	2.34^{-10}						2.34^{-10}
0.5834	8.56^{-11}		1.54^{-14}				8.56^{-11}
0.5220	1.18^{-11}		3.77^{-13}	3.08^{-11}			4.30^{-11}
0.4723		1.22^{-13}	3.75^{-12}	1.74^{-10}			1.78^{-10}
0.4312		5.42^{-13}	2.16^{-11}	1.28^{-9}		2.62^{-10}	1.56^{-9}
0.3967		4.52^{-12}	8.46^{-11}	1.50^{-9}		9.33^{-10}	2.52^{-9}
0.3673		1.70^{-11}	6.02^{-11}	5.57^{-9}		8.36^{-10}	6.48^{-9}
0.3420		2.80^{-11}	1.39^{-11}	9.58^{-9}	1.76^{-11}	3.49^{-9}	1.31^{-8}
0.3199		3.84^{-11}		1.65^{-8}	3.33^{-10}	4.62^{-9}	2.15^{-8}
0.3006		2.13^{-11}		3.54^{-8}	1.68^{-9}	9.71^{-9}	4.68^{-8}
0.2834		3.50^{-12}		5.25^{-8}	8.09^{-9}	1.59^{-8}	7.65^{-8}
0.2681				1.07^{-7}	3.16^{-8}	2.08^{-8}	1.59^{-7}
0.2543				2.06^{-7}	1.32^{-7}	3.75^{-8}	3.75^{-7}
0.2419				1.95^{-7}	1.00^{-6}	2.33^{-8}	1.22^{-6}
0.2307				2.70^{-7}	7.32^{-7}	1.10^{-8}	1.01^{-6}
0.2204				2.59^{-7}	2.82^{-7}	2.58^{-7}	7.99^{-7}
0.2110				8.74^{-7}	1.15^{-6}	2.89^{-7}	2.31^{-6}
0.2024				5.07^{-7}	1.01^{-6}	4.25^{-9}	1.52^{-6}
0.1945					5.69^{-7}	1.37^{-8}	5.83^{-7}
0.1871						3.19^{-9}	3.19^{-9}
0.1803						6.69^{-8}	6.69^{-8}
0.1740						1.84^{-7}	1.84^{-7}
0.1681							
0.1626							
0.1574							
0.1526							
0.1480							
0.1437							
0.1397							
0.1359							
0.1322							
0.1288							
0.1255							
0.1224							
0.1195							
0.1167							

Table 31

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : T = 4000°K and $\rho/\rho_o = 10^{-5}$

λ (μ)	$N_2(1^+)$	$N_2(2^+)$	$N_2^+(1^-)$	NO β	NO γ	O_2 (S-R)	μ_{Total}
1.9837							
1.4168							
1.1020	2.78^{-11}						2.78^{-11}
0.9016	4.11^{-11}						4.11^{-11}
0.7630	3.68^{-11}						3.68^{-11}
0.6612	2.21^{-11}						2.21^{-11}
0.5834	8.10^{-12}		8.26^{-15}				8.11^{-12}
0.5220	1.12^{-12}		2.03^{-13}	9.56^{-13}			2.28^{-12}
0.4723		1.15^{-14}	2.01^{-12}	5.40^{-12}			7.42^{-12}
0.4312		5.13^{-14}	1.16^{-11}	3.98^{-11}		2.65^{-12}	5.41^{-11}
0.3967		4.28^{-13}	4.54^{-11}	4.65^{-11}		9.44^{-12}	1.02^{-10}
0.3673		1.61^{-12}	3.24^{-11}	1.73^{-10}		8.46^{-12}	2.15^{-10}
0.3420		2.65^{-12}	7.49^{-12}	2.97^{-10}	5.44^{-13}	3.54^{-11}	3.36^{-10}
0.3199		3.64^{-12}		5.12^{-10}	1.03^{-11}	4.68^{-11}	5.73^{-10}
0.3006		2.01^{-12}		1.10^{-9}	5.20^{-11}	9.82^{-11}	1.25^{-9}
0.2834		3.32^{-13}		1.63^{-9}	2.51^{-10}	1.61^{-10}	2.04^{-9}
0.2681				3.30^{-9}	9.80^{-10}	2.10^{-10}	4.49^{-9}
0.2543				6.38^{-9}	4.08^{-9}	3.79^{-10}	1.08^{-8}
0.2419				6.05^{-9}	3.10^{-8}	2.36^{-10}	3.73^{-8}
0.2307				8.36^{-9}	2.27^{-8}	1.11^{-10}	3.12^{-8}
0.2204				8.02^{-9}	8.75^{-9}	2.61^{-9}	1.94^{-8}
0.2110				2.71^{-8}	3.56^{-8}	2.92^{-9}	6.56^{-8}
0.2024				1.57^{-8}	3.12^{-8}	4.30^{-11}	4.69^{-8}
0.1945					1.76^{-8}	1.39^{-10}	1.77^{-8}
0.1871						3.22^{-11}	3.22^{-11}
0.1803						6.77^{-10}	6.77^{-10}
0.1740						1.86^{-9}	1.86^{-9}
0.1681							
0.1626							
0.1574							
0.1526							
0.1480							
0.1437							
0.1397							
0.1359							
0.1322							
0.1288							
0.1255							
0.1224							
0.1195							
0.1167							

Table 32

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : $T = 4000^{\circ}K$ and $\rho/\rho_o = 10^{-6}$

λ (μ)	$N_2(1^+)$	$N_2(2^+)$	$N_2^+(1^-)$	NO β	NO γ	O_2 (S - R)	μ_{Total}
1.9837							
1.4168							
1.1020	2.33^{-12}						2.33^{-12}
0.9016	3.44^{-12}						3.44^{-12}
0.7630	3.08^{-12}						3.08^{-12}
0.6612	$1\ 85^{-12}$						1.85^{-12}
0.5834	6.78^{-13}		4.03^{-15}				6.82^{-13}
0.5220	9.39^{-14}		9.89^{-14}	2.78^{-14}			2.21^{-13}
0.4723		9.67^{-16}	9.83^{-13}	1.57^{-13}			1.14^{-12}
0.4312		4.30^{-15}	5.65^{-12}	1.16^{-12}		2.66^{-14}	6.84^{-12}
0.3967		3.59^{-14}	2.22^{-11}	1.35^{-12}		9.48^{-14}	2.37^{-11}
0.3673		1.35^{-13}	1.58^{-11}	5.02^{-12}		8.49^{-14}	2.10^{-11}
0.3420		2.22^{-13}	3.35^{-12}	8.63^{-12}	1.58^{-14}	3.55^{-13}	1.29^{-11}
0.3199		3.05^{-13}		1.49^{-11}	3.00^{-13}	4.69^{-13}	1.60^{-11}
0.3006		1.69^{-13}		3.19^{-11}	1.51^{-12}	9.86^{-13}	3.46^{-11}
0.2834		2.78^{-14}		4.72^{-11}	7.29^{-12}	1.62^{-12}	5.61^{-11}
0.2681				9.60^{-11}	2.85^{-11}	2.11^{-12}	1.27^{-10}
0.2543				1.85^{-11}	1.19^{-10}	3.81^{-12}	1.41^{-10}
0.2419				1.76^{-10}	9.02^{-10}	2.37^{-12}	1.08^{-9}
0.2307				2.43^{-10}	6.60^{-10}	1.12^{-12}	9.04^{-10}
0.2204				2.33^{-10}	2.54^{-10}	2.62^{-11}	5.13^{-10}
0.2110				7.87^{-10}	1.03^{-9}	2.93^{-11}	1.85^{-9}
0.2024				4.56^{-10}	9.06^{-10}	4.31^{-13}	1.36^{-9}
0.1945					5.12^{-10}	1.39^{-12}	5.13^{-10}
0.1871						3.23^{-13}	3.23^{-13}
0.1803						6.79^{-12}	6.79^{-12}
0.1740						1.86^{-11}	1.86^{-11}
0.1681							
0.1626							
0.1574							
0.1526							
0.1480							
0.1437							
0.1397							
0.1359							
0.1322							
0.1288							
0.1255							
0.1224							
0.1195							
0.1167							

Table 33

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : T = 6000°K and ρ/ρ_o = 10

λ (μ)	$N_2(1^+)$	$N_2(2^+)$	$N_2^+(1^-)$	NO β	NO γ	O_2 (S-R)	$\mu_{PD(O^-)}$	μ_{ff}	μ_{Total}
1.9837								2.69^{-4}	2.69^{-4}
1.4168								9.86^{-5}	9.86^{-5}
1.1020	7.02^{-3}							4.62^{-5}	7.07^{-3}
0.9016	1.13^{-2}							2.54^{-5}	1.13^{-2}
0.7630	1.22^{-2}						1.92^{-2}	1.54^{-5}	3.14^{-2}
0.6612	9.21^{-3}						2.34^{-2}	1.00^{-5}	3.26^{-2}
0.5834	5.42^{-3}		9.72^{-8}				2.55^{-2}	6.90^{-6}	3.09^{-2}
0.5220	7.84^{-4}		2.16^{-6}	3.01^{-3}			2.72^{-2}	4.90^{-6}	3.10^{-2}
0.4723		9.27^{-5}	1.80^{-5}	1.27^{-2}			2.82^{-2}	3.64^{-6}	4.10^{-2}
0.4312		3.44^{-4}	7.43^{-5}	5.89^{-2}		1.24^{-1}	2.93^{-2}	2.76^{-6}	2.13^{-1}
0.3967		1.72^{-3}	2.03^{-4}	5.25^{-2}		3.39^{-1}	2.95^{-2}	2.15^{-6}	4.23^{-1}
0.3673		4.75^{-3}	1.65^{-4}	1.42^{-1}		2.42^{-1}	2.98^{-2}	1.71^{-6}	4.19^{-1}
0.3420		5.67^{-3}	4.16^{-5}	2.01^{-1}	3.16^{-4}	8.18^{-1}	4.48^{-2}	1.38^{-6}	1.07
0.3199		8.71^{-3}		2.77^{-1}	5.52^{-3}	7.86^{-1}	5.31^{-2}	1.13^{-6}	1.13
0.3006		5.04^{-3}		4.78^{-1}	2.20^{-2}	1.37	5.73^{-2}	9.36^{-7}	1.93
0.2834		7.84^{-4}		5.52^{-1}	9.06^{-2}	1.80	6.02^{-2}	7.84^{-7}	2.50
0.2681				8.83^{-1}	2.65^{-1}	1.96	6.23^{-2}	6.64^{-7}	3.17
0.2543				1.52	8.48^{-1}	2.80	6.40^{-2}	5.65^{-7}	5.23
0.2419				1.18	4.03	1.40	6.57^{-2}	4.86^{-7}	6.68
0.2307				1.39	2.24	5.58^{-1}	6.73^{-2}	4.21^{-7}	4.26
0.2204				1.22	1.17	1.21^{-1}	6.86^{-2}	3.69^{-7}	1.46^{1}
0.2110				3.57	3.44	1.17^{-1}	7.49^{-2}	3.25^{-7}	1.88^{1}
0.2024				1.83	3.01	1.26^{-1}	7.82^{-2}	2.87^{-7}	5.04
0.1945					1.64	3.40^{-1}	7.99^{-2}	2.55^{-7}	2.06
0.1871						6.56^{-2}	8.16^{-2}	2.27^{-7}	1.47^{-1}
0.1803						1.38	8.28^{-2}	2.03^{-7}	1.46
0.1740						3.76	8.41^{-2}	1.82^{-7}	3.84
0.1681							8.58^{-2}	1.64^{-7}	8.58^{-2}
0.1626							8.74^{-2}	1.48^{-7}	8.74^{-2}
0.1574							8.87^{-2}	1.34^{-7}	8.87^{-2}
0.1526							9.00^{-2}	1.22^{-7}	9.00^{-2}
0.1480							9.16^{-2}	1.11^{-7}	9.16^{-2}
0.1437							9.29^{-2}	1.02^{-7}	9.29^{-2}
0.1397							9.41^{-2}	9.35^{-8}	9.41^{-2}
0.1359							9.54^{-2}	8.62^{-8}	9.54^{-2}
0.1322							9.66^{-2}	7.94^{-8}	9.66^{-2}
0.1288							9.83^{-2}	7.32^{-8}	9.83^{-2}
0.1255							9.96^{-2}	6.79^{-8}	9.96^{-2}
0.1224							1.01^{-1}	6.30^{-8}	1.01^{-1}
0.1195							1.02^{-1}	5.84^{-8}	1.02^{-1}
0.1167							1.03^{-1}	5.45^{-8}	1.03^{-1}

Table 34

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : T = 6000°K and ρ/ρ_o = 1

λ (μ)	$N_2(1^+)$	$N_2(2^+)$	$N_2^+(1^-)$	NO β	NO γ	O_2(S-R)	$\mu_{PD(O^-)}$	μ_{ff}	μ_{Total}
1.9837								1.66^{-5}	1.66^{-5}
1.4168								6.07^{-6}	6.07^{-6}
1.1020	7.16^{-4}							2.84^{-6}	7.19^{-4}
0.9016	1.16^{-3}							1.56^{-6}	1.16^{-3}
0.7630	1.25^{-3}						6.96^{-4}	9.47^{-7}	1.95^{-3}
0.6612	9.40^{-4}						8.48^{-4}	6.16^{-7}	1.79^{-3}
0.5834	5.53^{-4}		3.99^{-8}				9.24^{-4}	4.24^{-7}	1.48^{-3}
0.5220	8.00^{-5}		8.87^{-7}	1.41^{-4}			9.84^{-4}	3.02^{-7}	1.21^{-3}
0.4723		9.46^{-6}	7.40^{-6}	5.93^{-4}			1.02^{-3}	2.24^{-7}	1.63^{-3}
0.4312		3.51^{-5}	3.05^{-5}	2.75^{-3}		2.67^{-3}	1.06^{-3}	1.70^{-7}	6.55^{-3}
0.3967		1.75^{-4}	8.34^{-5}	2.45^{-3}		7.29^{-3}	1.07^{-3}	1.32^{-7}	1.11^{-2}
0.3673		4.85^{-4}	6.78^{-5}	6.64^{-3}		5.21^{-3}	1.08^{-3}	1.05^{-7}	1.35^{-2}
0.3420		5.79^{-4}	1.71^{-5}	9.39^{-3}	1.48^{-5}	1.76^{-2}	1.62^{-3}	8.49^{-8}	2.92^{-2}
0.3199		8.89^{-4}		1.30^{-2}	2.58^{-4}	1.69^{-2}	1.92^{-3}	6.95^{-8}	3.30^{-2}
0.3006		5.14^{-4}		2.24^{-2}	1.03^{-3}	2.95^{-2}	2.07^{-3}	5.76^{-8}	5.55^{-2}
0.2834		8.00^{-5}		2.58^{-2}	4.24^{-3}	3.88^{-2}	2.18^{-3}	4.82^{-8}	7.11^{-2}
0.2681				4.13^{-2}	1.24^{-2}	4.22^{-2}	2.26^{-3}	4.08^{-8}	9.82^{-2}
0.2543				7.12^{-2}	3.97^{-2}	6.02^{-2}	2.32^{-3}	3.47^{-8}	1.73^{-1}
0.2419				5.53^{-2}	1.88^{-1}	3.01^{-2}	2.38^{-3}	2.99^{-8}	2.76^{-1}
0.2307				6.49^{-2}	1.05^{-1}	1.20^{-2}	2.44^{-3}	2.59^{-8}	1.84^{-1}
0.2204				5.71^{-2}	5.46^{-2}	2.60^{-1}	2.48^{-3}	2.27^{-8}	3.74^{-1}
0.2110				1.67^{-1}	1.61^{-1}	2.51^{-1}	2.71^{-3}	2.00^{-8}	5.82^{-1}
0.2024				8.56^{-2}	1.41^{-1}	2.71^{-3}	2.83^{-3}	1.77^{-8}	2.32^{-1}
0.1945					7.68^{-2}	7.31^{-3}	2.89^{-3}	1.57^{-8}	8.70^{-2}
0.1871						1.41^{-3}	2.95^{-3}	1.40^{-8}	4.36^{-3}
0.1803						2.96^{-2}	3.00^{-3}	1.25^{-8}	3.26^{-2}
0.1740						8.09^{-2}	3.04^{-3}	1.12^{-8}	8.39^{-2}
0.1681							3.10^{-3}	1.01^{-8}	3.10^{-3}
0.1626							3.16^{-3}	9.11^{-8}	3.16^{-3}
0.1574							3.21^{-3}	8.24^{-9}	3.21^{-3}
0.1526							3.26^{-3}	7.51^{-9}	3.26^{-3}
0.1480							3.32^{-3}	6.85^{-9}	3.32^{-3}
0.1437							3.36^{-3}	6.27^{-9}	3.36^{-3}
0.1397							3.41^{-3}	5.75^{-9}	3.41^{3}
0.1359							3.45^{-3}	5.30^{-9}	3.45^{-3}
0.1322							3.50^{-3}	4.88^{-9}	3.50^{-3}
0.1288							3.56^{-3}	4.51^{-9}	3.56^{-3}
0.1255							3.60^{-3}	4.18^{-9}	3.60^{-3}
0.1224							3.65^{-3}	3.88^{-9}	3.65^{-3}
0.1195							3.69^{-3}	3.59^{-9}	3.69^{-3}
0.1167							3.72^{-3}	3.35^{-9}	3.72^{-3}

Table 35

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : T = 6000°K and $\rho/\rho_0 = 10^{-1}$

λ (μ)	$N_2(1^+)$	$N_2(2^+)$	$N_2^+(1^-)$	NO β	NO γ	O_2(S-R)	$\mu_{PD(O^-)}$	μ_{ff}	μ_{Total}
1.9837								6.08^{-7}	6.08^{-7}
1.4168								2.23^{-7}	2.23^{-7}
1.1020	6.88^{-5}							1.04^{-7}	6.89^{-5}
0.9016	1.11^{-4}							5.74^{-8}	1.11^{-4}
0.7630	1.20^{-4}						1.52^{-5}	3.48^{-8}	1.35^{-4}
0.6612	9.03^{-5}						1.85^{-5}	2.26^{-8}	1.09^{-4}
0.5834	5.32^{-5}		2.00^{-8}				2.01^{-5}	1.56^{-8}	7.33^{-5}
0.5220	7.69^{-6}		4.44^{-7}	4.94^{-6}			2.14^{-5}	1.11^{-8}	3.45^{-5}
0.4723		9.09^{-7}	3.70^{-6}	2.08^{-5}			2.22^{-5}	8.24^{-9}	4.76^{-5}
0.4312		3.38^{-6}	1.53^{-5}	9.66^{-5}		3.42^{-5}	2.31^{-5}	6.25^{-9}	1.74^{-4}
0.3967		1.68^{-5}	4.17^{-5}	8.60^{-5}		9.33^{-5}	2.32^{-5}	4.86^{-9}	2.61^{-4}
0.3673		4.66^{-5}	3.39^{-5}	2.33^{-4}		6.67^{-5}	2.35^{-5}	3.86^{-9}	4.04^{-4}
0.3420		5.56^{-5}	8.54^{-6}	3.29^{-4}	5.19^{-7}	2.25^{-4}	3.53^{-5}	3.12^{-9}	6.54^{-4}
0.3199		8.54^{-5}		4.54^{-4}	9.06^{-6}	2.16^{-4}	4.19^{-5}	2.55^{-9}	8.06^{-4}
0.3006		4.94^{-5}		7.85^{-4}	3.60^{-5}	3.78^{-4}	4.52^{-5}	2.12^{-9}	1.29^{-3}
0.2834		7.69^{-6}		9.05^{-4}	1.48^{-4}	4.97^{-4}	4.75^{-5}	1.77^{-9}	1.61^{-3}
0.2681				1.45^{-3}	4.34^{-4}	5.40^{-4}	4.91^{-5}	1.48^{-9}	2.47^{-3}
0.2543				2.50^{-3}	1.39^{-3}	7.71^{-4}	5.04^{-5}	1.28^{-9}	4.71^{-3}
0.2419				1.94^{-3}	6.60^{-3}	3.85^{-4}	5.17^{-5}	1.10^{-9}	8.98^{-3}
0.2307				2.27^{-3}	3.67^{-3}	1.54^{-4}	5.41^{-5}	9.52^{-10}	6.15^{-3}
0.2204				2.00^{-3}	1.91^{-3}	3.33^{-3}	5.41^{-5}	8.35^{-10}	7.29^{-3}
0.2110				5.85^{-3}	5.64^{-3}	3.21^{-3}	5.90^{-5}	7.36^{-10}	1.48^{-2}
0.2024				3.00^{-3}	4.94^{-3}	3.47^{-5}	6.16^{-5}	6.49^{-10}	8.04^{-3}
0.1945					2.69^{-3}	9.36^{-5}	6.30^{-5}	5.76^{-10}	2.85^{-3}
0.1871						1.80^{-5}	6.43^{-5}	5.13^{-10}	8.23^{-5}
0.1803						3.79^{-4}	6.53^{-5}	4.59^{-10}	4.44^{-4}
0.1740						1.04^{-3}	6.62^{-5}	4.11^{-10}	1.11^{-3}
0.1681							6.76^{-5}	3.70^{-10}	6.76^{-5}
0.1626							6.89^{-5}	3.35^{-10}	6.89^{-5}
0.1574							6.99^{-5}	3.03^{-10}	6.99^{-5}
0.1526							7.09^{-5}	2.76^{-10}	7.09^{-5}
0.1480							7.22^{-5}	2.52^{-10}	7.22^{-5}
0.1437							7.32^{-5}	2.30^{-10}	7.32^{-5}
0.1397							7.42^{-5}	2.11^{-10}	7.42^{-5}
0.1359							7.51^{-5}	1.95^{-10}	7.51^{-5}
0.1322							7.61^{-5}	1.79^{-10}	7.61^{-5}
0.1288							7.75^{-5}	1.66^{-10}	7.75^{-5}
0.1255							7.84^{-5}	1.54^{-10}	7.84^{-5}
0.1224							7.94^{-5}	1.43^{-10}	7.94^{-5}
0.1195							8.04^{-5}	1.32^{-10}	8.04^{-5}
0.1167							8.11^{-5}	1.23^{-10}	8.11 [illegible]

Table 36

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : T = 6000^{o}K and $\rho/\rho_o = 10^{-2}$

λ (μ)	$N_2(1^+)$	$N_2(2^+)$	$N_2^+(1^-)$	NO β	NO γ	O_2 (S - R)	$\mu_{PL(O^-)}$	μ_{ff}	μ_{Total}
1.9837								1.94^{-8}	1.94^{-8}
1.4168								7.09^{-9}	7.09^{-9}
1.1020	5.72^{-6}							3.32^{-9}	5.72^{-6}
0.9016	9.23^{-6}							1.83^{-9}	9.23^{-6}
0.7630	9.98^{-6}						2.78^{-7}	1.11^{-9}	1.03^{-5}
0.6612	7.50^{-6}						3.39^{-7}	7.20^{-10}	7.84^{-6}
0.5834	4.42^{-6}		9.36^{-9}				3.69^{-7}	4.96^{-10}	4.80^{-6}
0.5220	6.39^{-7}		2.08^{-7}	1.47^{-7}			3.93^{-7}	3.53^{-10}	1.39^{-6}
0.4723		7.55^{-8}	1.74^{-6}	6.20^{-7}			4.08^{-7}	2.62^{-10}	2.84^{-6}
0.4312		2.80^{-7}	7.16^{-6}	2.88^{-6}		3.66^{-7}	4.23^{-7}	1.99^{-10}	1.11^{-5}
0.3967		1.40^{-6}	1.95^{-5}	2.57^{-6}		9.99^{-7}	4.26^{-7}	1.55^{-10}	2.49^{-5}
0.3673		3.87^{-6}	1.59^{-5}	6.95^{-6}		7.14^{-7}	4.31^{-7}	1.23^{-10}	2.79^{-5}
0.3420		4.62^{-6}	4.00^{-6}	9.82^{-6}	1.55^{-8}	2.41^{-6}	6.47^{-7}	9.92^{-11}	2.15^{-5}
0.3199		7.09^{-6}		1.36^{-5}	2.70^{-7}	2.32^{-6}	7.68^{-7}	8.12^{-11}	2.40^{-5}
0.3006		4.10^{-6}		2.34^{-5}	1.07^{-6}	4.04^{-6}	8.28^{-7}	6.73^{-11}	3.34^{-5}
0.2834		6.38^{-7}		2.70^{-5}	4.43^{-6}	5.32^{-6}	8.71^{-7}	5.64^{-11}	3.83^{-5}
0.2681				4.32^{-5}	1.30^{-5}	5.78^{-6}	9.01^{-7}	4.77^{-11}	6.29^{-5}
0.2543				7.45^{-5}	4.15^{-5}	8.25^{-6}	9.25^{-7}	4.06^{-11}	1.25^{-4}
0.2419				5.78^{-5}	1.97^{-4}	4.12^{-6}	9.49^{-7}	3.50^{-11}	2.60^{-4}
0.2307				6.78^{-5}	1.09^{-4}	1.64^{-6}	9.73^{-7}	3.03^{-11}	1.79^{-4}
0.2204				5.97^{-5}	5.71^{-5}	3.56^{-5}	9.92^{-7}	2.66^{-11}	1.53^{-4}
0.2110				1.74^{-4}	1.68^{-4}	3.44^{-5}	1.08^{-6}	2.34^{-11}	3.77^{-4}
0.2024				8.96^{-5}	1.47^{-4}	3.71^{-7}	1.13^{-6}	2.06^{-11}	2.38^{-4}
0.1945					8.03^{-5}	1.00^{-6}	1.15^{-6}	1.83^{-11}	8.25^{-5}
0.1871						1.93^{-7}	1.18^{-6}	1.63^{-11}	1.37^{-6}
0.1803						4.06^{-6}	1.20^{-6}	1.46^{-11}	5.26^{-6}
0.1740						1.11^{-5}	1.22^{-6}	1.31^{-11}	1.23^{-5}
0.1681							1.24^{-6}	1.18^{-11}	1.24^{-6}
0.1626							1.26^{-6}	1.07^{-11}	1.26
0.1574							1.28^{-6}	9.63^{-12}	1.28
0.1526							1.30^{-6}	8.78^{-12}	1.30
0.1480							1.32^{-6}	8.01^{-12}	1.32
0.1437							1.34^{-6}	7.33^{-12}	1.34
0.1397							1.36^{-6}	6.73^{-12}	1.36
0.1359							1.38^{-6}	6.20^{-12}	1.38
0.1322							1.40^{-6}	5.71^{-12}	1.40
0.1288							1.42^{-6}	5.27^{-12}	1.42
0.1255							1.44^{-6}	4.89^{-12}	1.44
0.1224							1.46^{-6}	4.53^{-12}	1.46
0.1195							1.48^{-6}	4.20^{-12}	1.48
0.1167							1.49^{-6}	3.92^{-12}	1.49

Table 37

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : T = 6000°K and $\rho/\rho_o = 10^{-3}$

λ (μ)	$N_2(1^+)$	$N_2(2^+)$	$N_2^+(1^-)$	NO β	NO γ	O_2 (S - R)	$\mu_{PD(O^-)}$	μ_{tf}	μ_{Total}
1.9837								6.19^{-10}	6.19^{-10}
1.4168								2.27^{10}	2.27^{-10}
1.1020	3.18^{-7}							1.06^{-10}	3.18^{-7}
0.9016	5.13^{-7}							5.84^{-11}	5.13^{-7}
0.7630	5.55^{-7}						5.05^{-9}	3.54^{-11}	5.60^{-7}
0.6612	4.17^{-7}						6.14^{-9}	2.31^{-11}	4.23^{-7}
0.5834	2.46^{-7}		2.90^{-9}				6.69^{-9}	1.59^{-11}	2.56^{-7}
0.5220	3.55^{-8}		6.44^{-8}	3.61^{-9}			7.13^{-9}	1.13^{-11}	1.11^{-7}
0.4723		4.20^{-9}	5.37^{-7}	1.48^{-8}			7.40^{-9}	8.39^{-12}	5.63^{-7}
0.4312		1.56^{-8}	2.22^{-6}	6.86^{-8}		3.74^{-9}	7.68^{-9}	6.36^{-12}	2.32^{-6}
0.3967		7.77^{-8}	6.05^{-6}	6.11^{-8}		1.02^{-8}	7.73^{-9}	4.95^{-12}	6.21^{-6}
0.3673		2.15^{-7}	4.92^{-6}	1.65^{-7}		7.29^{-9}	7.82^{-9}	3.93^{-12}	5.32^{-6}
0.3420		2.57^{-7}	1.24^{-6}	2.34^{-7}	3.69^{-10}	2.46^{-8}	1.17^{-8}	3.18^{-12}	1.77^{-6}
0.3199		3.94^{-7}		3.23^{-7}	6.44^{-9}	2.36^{-8}	1.39^{-8}	2.60^{-12}	7.61^{-7}
0.3006		2.28^{-7}		5.57^{-7}	2.56^{-8}	4.13^{-8}	1.50^{-8}	2.15^{-12}	8.67^{-7}
0.2834		3.55^{-8}		6.43^{-7}	1.06^{-7}	5.43^{-8}	1.58^{-8}	1.81^{-12}	8.55^{-7}
0.2681				1.03^{-6}	3.09^{-7}	5.90^{-8}	1.63^{-8}	1.53^{-12}	1.41^{-6}
0.2543				1.77^{-6}	9.88^{-7}	8.42^{-8}	1.68^{-8}	1.30^{-12}	2.86^{-6}
0.2419				1.38^{-6}	4.69^{-6}	4.21^{-8}	1.72^{-8}	1.12^{-12}	6.13^{-6}
0.2307				1.62^{-6}	2.60^{-6}	1.68^{-8}	1.77^{-8}	9.69^{-13}	4.25^{-6}
0.2204				1.42^{-6}	1.36^{-6}	3.64^{-7}	1.80^{-8}	8.49^{-13}	3.16^{-6}
0.2110				4.15^{-6}	1.68^{-6}	3.51^{-7}	1.96^{-8}	7.49^{-13}	6.20^{-6}
0.2024				2.13^{-6}	3.51^{-6}	3.79^{-9}	2.05^{-8}	6.61^{-13}	5.66^{-6}
0.1945					1.91^{-6}	1.02^{-8}	2.10^{-8}	5.86^{-13}	1.94^{-6}
0.1871						1.97^{-9}	2.14^{-8}	5.22^{-13}	2.34^{-8}
0.1803						4.14^{-8}	2.17^{-8}	4.68^{-13}	6.31^{-8}
0.1740						1.13^{-7}	2.20^{-8}	4.18^{-13}	1.35^{-7}
0.1681							2.25^{-8}	3.77^{-13}	2.25^{-8}
0.1626							2.29^{-8}	3.41^{-13}	2.29^{-8}
0.1574							2.33^{-8}	3.08^{-13}	2.33^{-8}
0.1526							2.36^{-8}	2.81^{-13}	2.36^{-8}
0.1480							2.40^{-8}	2.56^{-13}	2.40^{-8}
0.1437							2.44^{-8}	2.34^{-13}	2.44^{-8}
0.1397							2.47^{-8}	2.15^{-13}	2.47^{-8}
0.1359							2.50^{-8}	1.98^{-13}	2.50^{-8}
0.1322							2.53^{-8}	1.83^{-13}	2.53^{-8}
0.1288							2.58^{-8}	1.69^{-13}	2.58^{-8}
0.1255							2.61^{-8}	1.56^{-13}	2.61^{-8}
0.1224							2.64^{-8}	1.45^{-13}	2.64^{-8}
0.1195							2.68^{-8}	1.34^{-13}	2.68^{-8}
0.1167							2.70^{-8}	1.25^{-13}	2.70^{-8}

Table 38

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : $T = 6000^{o}K$ and $\rho/\rho_o = 10^{-4}$

λ (μ)	$N_2(1^+)$	$N_2(2^+)$	$N_2^+(1^-)$	NO β	NO γ	O_2(S-R)	$\mu_{PD(O^-)}$	μ_{ff}	μ_{Total}
1.9837								3.13^{-11}	3.13^{-11}
1.4168								1.15^{-11}	1.15^{-11}
1.1020	7.58^{-9}							5.37^{-12}	7.59^{-9}
0.9016	1.22^{-8}							2.95^{-12}	1.22^{-8}
0.7630	1.32^{-8}						1.14^{-10}	1.79^{-12}	1.33^{-8}
0.6612	9.95^{-9}						1.38^{-10}	1.17^{-12}	1.01^{-8}
0.5834	5.86^{-9}		3.08^{-10}				1.51^{-10}	8.02^{-13}	6.32^{-9}
0.5220	8.48^{-10}		6.84^{-9}	5.45^{-11}			1.61^{-10}	5.71^{-13}	7.90^{-9}
0.4723		1.00^{-10}	5.71^{-8}	2.29^{-10}			1.67^{-10}	4.24^{-13}	5.76^{-8}
0.4312		3.72^{-10}	2.36^{-7}	1.07^{-9}		3.76^{-11}	1.73^{-10}	3.21^{-13}	2.38^{-7}
0.3967		1.86^{-9}	6.43^{-7}	9.50^{-10}		1.03^{-10}	1.74^{-10}	2.50^{-13}	6.46^{-7}
0.3673		5.14^{-9}	5.24^{-7}	2.57^{-9}		7.35^{-11}	1.76^{-10}	1.99^{-13}	5.32^{-7}
0.3420		6.13^{-9}	1.32^{-7}	3.63^{-9}	5.73^{-12}	2.48^{-10}	2.65^{-10}	1.61^{-13}	1.42^{-7}
0.3199		9.41^{-9}		5.02^{-9}	1.00^{-10}	2.38^{-10}	3.14^{-10}	1.31^{-13}	1.51^{-8}
0.3006		5.44^{-9}		8.66^{-9}	3.97^{-10}	4.16^{-10}	3.39^{-10}	1.09^{-13}	1.53^{-8}
0.2834		8.47^{-10}		9.99^{-9}	1.64^{-9}	5.47^{-10}	3.56^{-10}	9.12^{-14}	1.34^{-8}
0.2681				1.60^{-8}	4.80^{-9}	5.95^{-10}	3.68^{-10}	7.72^{-14}	2.18^{-8}
0.2543				2.76^{-8}	1.54^{-8}	8.49^{-10}	3.78^{-10}	6.57^{-14}	4.42^{-8}
0.2419				2.14^{-8}	7.29^{-8}	4.24^{-10}	3.88^{-10}	5.65^{-14}	9.51^{-8}
0.2307				2.51^{-8}	4.05^{-8}	1.69^{-10}	3.98^{-10}	4.90^{-14}	6.62^{-8}
0.2204				2.21^{-8}	2.11^{-8}	3.67^{-9}	4.05^{-10}	4.29^{-14}	4.73^{-8}
0.2110				6.46^{-8}	6.23^{-8}	3.54^{-9}	4.42^{-10}	3.79^{-14}	1.31^{-7}
0.2024				3.31^{-8}	5.46^{-8}	3.82^{-11}	4.62^{-10}	3.34^{-14}	8.82^{-8}
0.1945					2.97^{-8}	1.03^{-10}	4.72^{-10}	2.96^{-14}	3.03^{-8}
0.1871						1.99^{-11}	4.82^{-10}	2.64^{-14}	5.02^{-10}
0.1803						4.17^{-10}	4.89^{-10}	2.36^{-14}	9.06^{-10}
0.1740						1.14^{-9}	4.97^{-10}	2.11^{-14}	1.64^{-9}
0.1681							5.07^{-10}	1.90^{-14}	5.07^{-10}
0.1626							5.17^{-10}	1.72^{-14}	5.17^{-10}
0.1574							5.24^{-10}	1.56^{-14}	5.24^{-10}
0.1526							5.31^{-10}	1.42^{-14}	5.31^{-10}
0.1480							5.41^{-10}	1.30^{-14}	5.41^{-10}
0.1437							5.49^{-10}	1.18^{-14}	5.49^{-10}
0.1397							5.56^{-10}	1.09^{-14}	5.56^{-10}
0.1359							5.64^{-10}	1.00^{-14}	5.64^{-10}
0.1322							5.71^{-10}	9.23^{-15}	5.71^{-10}
0.1288							5.81^{-10}	8.52^{-15}	5.81^{-10}
0.1255							5.88^{-10}	7.90^{-15}	5.88^{-10}
0.1224							5.96^{-10}	7.33^{-15}	5.96^{-10}
0.1195							6.03^{-10}	6.79^{-15}	6.03^{-10}
0.1167							6.08^{-10}	6.34^{-15}	6.08^{-10}

Table 39

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : T = 6000°K and $\rho/\rho_o = 10^{-5}$

λ (μ)	$N_2(1^+)$	$N_2(2^+)$	$N_2^+(1^-)$	NO β	NO γ	O_2 (S-R)	$\mu_{PD(O^-)}$	μ_{ff}	μ_{Total}
1.9837								2.69^{-12}	2.69^{-12}
1.4168								9.86^{-13}	9.86^{-13}
1.1020	9.12^{-11}							4.62^{-13}	9.17^{-11}
0.9016	1.47^{-10}							2.54^{-13}	1.47^{-10}
0.7630	1.59^{-10}						3.32^{-12}	1.54^{-13}	1.62^{-10}
0.6612	1.20^{-10}						4.04	1.00^{-13}	1.24^{-10}
0.5834	7.05^{-11}		1.26^{-11}				4.41	6.90^{-14}	8.76^{-11}
0.5220	1.02^{-11}		2.80^{-10}	5.93^{-13}			4.69	4.90^{-14}	2.95^{-10}
0.4723		1.20^{-12}	2.34^{-9}	2.50^{-12}			4.88	3.64^{-14}	2.35^{-9}
0.4312		4.47^{-12}	9.65^{-9}	1.16^{-11}		3.74^{-13}	5.06	2.76^{-14}	9.67^{-9}
0.3967		2.23^{-11}	2.64^{-8}	1.03^{-11}		1.02^{-12}	5.09	2.15^{-14}	2.64^{-8}
0.3673		6.17^{-11}	2.14^{-8}	2.80^{-11}		7.29^{-13}	5.15	1.71^{-14}	2.15^{-8}
0.3420		7.37^{-11}	5.40^{-9}	3.96^{-11}	6.24^{-14}	2.46^{-12}	7.73	1.38^{-14}	5.52^{-9}
0.3199		1.13^{-10}		5.46^{-11}	1.09^{-12}	2.37^{-12}	9.17	1.13^{-14}	1.80^{-10}
0.3006		6.54^{-11}		9.43^{-11}	4.33^{-12}	4.13^{-12}	9.90	9.36^{-15}	1.78^{-10}
0.2834		1.02^{-11}		1.09^{-10}	1.79^{-11}	5.43^{-12}	1.04^{-11}	7.84^{-15}	1.53^{-10}
0.2681				1.74^{-10}	5.22^{-11}	5.91^{-12}	1.08^{-11}	6.64^{-15}	2.43^{-10}
0.2543				3.00^{-10}	1.67^{-10}	8.43^{-12}	1.11	5.65^{-15}	4.87^{-10}
0.2419				2.33^{-10}	7.94^{-10}	4.21^{-12}	1.13	4.86^{-15}	1.04^{-9}
0.2307				2.73^{-10}	4.41^{-10}	1.68^{-12}	1.16	4.21^{-15}	7.27^{-10}
0.2204				2.40^{-10}	2.30^{-10}	3.64^{-11}	1.18	3.69^{-15}	5.18^{-10}
0.2110				7.03^{-10}	6.78^{-10}	3.51^{-11}	1.29	3.25^{-15}	1.43^{-9}
0.2024				3.61^{-10}	5.94^{-10}	3.79^{-13}	1.35	2.87^{-15}	9.69^{-10}
0.1945					3.24^{-10}	1.02^{-12}	1.38	2.55^{-15}	3.39^{-10}
0.1871						1.97^{-13}	1.41	2.27^{-15}	1.43^{-11}
0.1803						4.14^{-12}	1.43	2.03^{-15}	1.84^{-11}
0.1740						1.13^{-11}	1.45	1.82^{-15}	2.58^{-11}
0.1681							1.48	1.64^{-15}	1.48^{-11}
0.1626							1.51	1.48^{-15}	1.51^{-11}
0.1574							1.53	1.34^{-15}	1.53^{-11}
0.1526							1.55	1.22^{-15}	1.55^{-11}
0.1480							1.58	1.11^{-15}	1.58^{-11}
0.1437							1.60	1.02^{-15}	1.60^{-11}
0.1397							1.63	9.35^{-16}	1.63^{-11}
0.1359							1.65	8.62^{-16}	1.65^{-11}
0.1322							1.67	7.94^{-16}	1.67^{-11}
0.1288							1.70	7.32^{-16}	1.70^{-11}
0.1255							1.72	6.79^{-16}	1.72^{-11}
0.1224							1.74	6.30^{-16}	1.74^{-11}
0.1195							1.76	5.84^{-16}	1.76^{-11}
0.1167							1.78	5.45^{-16}	1.78^{-11}

Table 40

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : T = 6000^{o}K and $\rho/\rho_o = 10^{-6}$

λ (μ)	$N_2(1^+)$	$N_2(2^+)$	$N_2^+(1^-)$	NO β	NO γ	O_2(S-R)	$\mu_{PD(O^-)}$	μ_{ff}	μ_{Total}
1.9837								2.61^{-13}	2.61^{-13}
1.4168								9.57^{-14}	9.57^{-14}
1.1020	9.24^{-13}							4.48^{-14}	9.69^{-13}
0.9016	1.49^{-12}							2.46^{-14}	1.51^{-12}
0.7630	1.61^{-12}						1.03^{-13}	1.49^{-14}	1.73^{-12}
0.6612	1.21^{-12}						1.26^{-13}	9.72^{-15}	1.35^{-12}
0.5834	7.14^{-13}		4.09^{-13}				1.37^{-13}	6.70^{-15}	1.27^{-12}
0.5220	1.03^{-13}		9.09^{-12}	5.93^{-15}			1.46^{-13}	4.76^{-15}	9.35^{-12}
0.4723		1.22^{-14}	7.59^{-11}	2.50^{-14}			1.52^{-13}	3.54^{-15}	7.61^{-11}
0.4312		4.53^{-14}	3.13^{-10}	1.16^{-13}		3.71^{-15}	1.57^{-13}	2.68^{-15}	3.13^{-10}
0.3967		2.26^{-13}	8.55^{-10}	1.03^{-13}		1.01^{-14}	1.58^{-13}	2.09^{-15}	8.55^{-10}
0.3673		6.26^{-13}	6.96^{-10}	2.80^{-13}		7.23^{-15}	1.60^{-13}	1.66^{-15}	6.97^{-10}
0.3420		7.47^{-13}	1.75^{-10}	3.96^{-13}	6.24^{-16}	2.44^{-14}	2.40^{-13}	1.34^{-15}	1.76^{-10}
0.3199		1.15^{-12}		5.46^{-13}	1.09^{-14}	2.35^{-14}	2.85^{-13}	1.10^{-15}	2.02^{-12}
0.3006		6.63^{-13}		9.43^{-13}	4.33^{-14}	4.09^{-14}	3.08^{-13}	9.08^{-16}	2.00^{-12}
0.2834		1.03^{-13}		1.09^{-12}	1.79^{-13}	5.39^{-14}	3.24^{-13}	7.61^{-16}	1.75^{-12}
0.2681				1.74^{-12}	5.22^{-13}	5.86^{-14}	3.35^{-13}	6.44^{-16}	2.66^{-12}
0.2543				3.00^{-12}	1.67^{-12}	8.36^{-14}	3.44^{-13}	5.48^{-16}	5.10^{-12}
0.2419				2.33^{-12}	7.94^{-12}	4.18^{-14}	3.53^{-13}	4.72^{-16}	1.07^{-11}
0.2307				2.73^{-12}	4.41^{-12}	1.67^{-14}	3.62^{-13}	4.09^{-16}	7.52^{-12}
0.2204				2.40^{-12}	2.30^{-12}	3.61^{-13}	3.69^{-13}	3.58^{-16}	5.43^{-12}
0.2110				7.03^{-12}	6.79^{-12}	3.48^{-13}	4.02^{-13}	3.16^{-16}	1.46^{-11}
0.2024				3.61^{-12}	5.94^{-12}	3.76^{-15}	4.20^{-13}	2.79^{-16}	9.97^{-12}
0.1945					3.24^{-12}	1.01^{-14}	4.29^{-13}	2.47^{-16}	3.68^{-12}
0.1871						1.96^{-15}	4.38^{-13}	2.20^{-16}	4.40^{-13}
0.1803						4.11^{-14}	4.45^{-13}	1.97^{-16}	4.86^{-13}
0.1740						1.12^{-13}	4.52^{-13}	1.76^{-16}	5.64^{-13}
0.1681							4.61^{-13}	1.59^{-16}	4.61^{-13}
0.1626							4.70^{-13}	1.44^{-16}	4.70^{-13}
0.1574							4.76^{-13}	1.30^{-16}	4.76^{-13}
0.1526							4.83^{-13}	1.19^{-16}	4.83^{-13}
0.1480							4.92^{-13}	1.08^{-16}	4.92^{-13}
0.1437							4.99^{-13}	9.89^{-17}	4.99^{-13}
0.1397							5.06^{-13}	9.08^{-17}	5.06^{-13}
0.1359							5.12^{-13}	8.36^{-17}	5.12^{-13}
0.1322							5.19^{-13}	7.70^{-17}	5.19^{-13}
0.1288							5.28^{-13}	7.11^{-17}	5.28^{-13}
0.1255							5.35^{-13}	6.60^{-17}	5.35^{-13}
0.1224							5.42^{-13}	6.12^{-17}	5.42^{-13}
0 1195							5.48^{-13}	5.67^{-17}	5.48^{-13}
0.1167							5.53^{13}	5.29^{-17}	5.53^{-13}

Table 41

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : $T = 8000^{o}K$ and $\rho/\rho_o = 10$

λ (μ)	$N_2(1^+)$	$N_2(2^+)$	$N_2^+(1^-)$	NO β	NO γ	O_2 (S-R)	$\mu_{PD(O^-)}$	μ_{ff}	μ_{Total}
1.9837								2.54^{-2}	2.54^{-2}
1.4168								9.24^{-3}	9.24^{-3}
1.1020	3.17^{-2}							4.34^{-3}	3.60^{-2}
0.9016	5.23^{-2}							2.38^{-3}	5.47^{-2}
0.7630	5.83^{-2}						8.71^{-2}	1.44^{-3}	1.47^{-1}
0.6612	4.33^{-2}						1.06^{-1}	9.32^{-4}	1.50^{-1}
0.5834	2.35^{-2}		3.10^{-5}				1.16	6.35^{-4}	1.40^{-1}
0.5220	5.02^{-3}		6.59^{-4}	8.50^{-3}			1.23	4.56^{-4}	1.38^{-1}
0.4723		4.99^{-3}	5.08^{-3}	3.10^{-2}			1.28	3.36^{-4}	1.69^{-1}
0.4312		1.69^{-2}	1.78^{-2}	1.15^{-1}		8.73^{-2}	1.33	2.56^{-4}	3.70^{-1}
0.3967		6.63^{-2}	4.01^{-2}	8.82^{-2}		2.09^{-1}	1.34	2.00^{-4}	5.38^{-1}
0.3673		1.54^{-1}	3.53^{-2}	2.06^{-1}		1.33^{-1}	1.35	1.59^{-4}	6.63^{-1}
0.3420		1.55^{-1}	9.27^{-3}	2.65^{-1}	4.66^{-4}	4.05^{-1}	2.03	1.28^{-4}	1.04
0.3199		2.54^{-1}		3.26^{-1}	7.03^{-3}	3.30^{-1}	2.41	1.05^{-4}	1.16
0.3006		1.49^{-1}		5.06^{-1}	2.31^{-2}	5.28^{-1}	2.59	8.69^{-5}	1.47
0.2834		2.34^{-2}		5.13^{-1}	9.44^{-2}	6.18^{-1}	2.73	7.28^{-5}	1.52
0.2681				7.30^{-1}	2.22^{-1}	6.17^{-1}	2.82	6.16^{-5}	1.85
0.2543				1.19	6.22^{-1}	7.78^{-1}	2.90	5.26^{-5}	2.88
0.2419				8.36^{-1}	2.33	3.49^{-1}	2.97	4.53^{-5}	3.81
0.2307				9.04^{-1}	1.14	1.28^{-1}	3.05	3.93^{-5}	2.48
0.2214				7.61^{-1}	6.05^{-1}	2.79	3.11	3.43^{-5}	4.55
0.2110				2.07	1.71	2.39	3.39	3.01^{-5}	6.51
0.2024				9.96^{-1}	1.49	2.22^{-2}	3.54	2.63^{-5}	2.86
0.1945					7.99^{-1}	5.45^{-2}	3.62	2.33^{-5}	1.22
0.1871						9.54^{-3}	3.69	2.08^{-5}	3.79^{-1}
0.1803						2.01^{-1}	3.75	1.86^{-5}	5.76^{-1}
0.1740						5.50^{-1}	3.81	1.67^{-5}	9.31^{-1}
0.1681							3.88	1.51^{-5}	3.88^{-1}
0.1626							3.96	1.36^{-5}	3.96^{-1}
0.1574							4.02	1.24^{-5}	4.02^{-1}
0.1526							4.07	1.13^{-5}	4.07^{-1}
0.1480							4.15	1.03^{-5}	4.15^{-1}
0.1437							4.20	9.41^{-6}	4.20^{-1}
0.1397							4.26	8.63^{-6}	4.26^{-1}
0.1359							4.32	7.96^{-6}	4.32^{-1}
0.1322							4.38	7.34^{-6}	4.38^{-1}
0.1288							4.45	6.76^{-6}	4.45^{-1}
0.1255							4.51	6.27^{-6}	4.51^{-1}
0.1224							4.56	5.81^{-6}	4.56^{-1}
0.1195							4.62	5.40^{-6}	4.62^{-1}
0.1167							4.66	5.03^{-6}	4.66^{-1}

Table 42

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : T = 8000°K and ρ/ρ_o = 1

λ (μ)	$N_2(1^+)$	$N_2(2^+)$	$N_2^+(1^-)$	NO β	NO γ	O_2 (S - R)	$\mu_{PD(O^-)}$	μ_{ff}	μ_{Total}
1.9837								1.10^{-3}	1.10^{-3}
1.4168								3.98^{-4}	3.98^{-4}
1.1020	2.66^{-3}							1.87^{-4}	2.85^{-3}
0.9016	4.39^{-3}							1.03^{-4}	4.49^{-3}
0.7630	4.89^{-3}						2.11^{-3}	6.19^{-5}	7.06^{-3}
0.6612	3.62^{-3}						2.57^{-3}	4.02^{-5}	6.23^{-3}
0.5834	1.97^{-3}		1.25^{-5}				2.80^{-3}	2.74^{-5}	4.81^{-3}
0.5220	4.21^{-4}		2.65^{-4}	2.88^{-4}			2.99^{-3}	1.97^{-5}	3.98^{-3}
0.4723		4.18^{-4}	2.05^{-3}	1.05^{-3}			3.10^{-3}	1.45^{-5}	6.63^{-}[illegible]
0.4312		1.42^{-3}	7.16^{-3}	3.89^{-3}		1.19^{-3}	3.22^{-3}	1.11^{-5}	1.69^{-2}
0.3967		5.56^{-3}	1.62^{-2}	2.99^{-3}		2.85^{-3}	3.24^{-3}	8.60^{-6}	3.98^{-2}
0.3673		1.29^{-2}	1.42^{-2}	6.98^{-3}		1.81^{-3}	3.28^{-3}	6.83^{-6}	3.92^{-2}
0.3420		1.30^{-2}	3.73^{-2}	8.98^{-3}	1.58^{-5}	5.52^{-3}	4.92^{-3}	5.52^{-6}	6.97^{-2}
0.3199		[illegible]		1.11^{-2}	2.59^{-4}	4.50^{-3}	5.84^{-3}	4.51^{-6}	4.30^{-2}
0.3006		[illegible]		1.71^{-2}	7.83^{-4}	7.19^{-3}	6.30^{-3}	3.74^{-6}	4.39^{-2}
0.2834		1.88^{-3}		1.74^{-2}	3.20^{-3}	8.43^{-3}	6.62^{-3}	3.14^{-6}	3.75^{-2}
0.2681				2.48^{-2}	7.51^{-3}	8.41^{-3}	6.85^{-3}	2.65^{-6}	4.76^{-2}
0.2543				4.04^{-2}	2.11^{-2}	1.06^{-2}	7.03^{-3}	2.27^{-6}	7.91^{-2}
0.2419				2.83^{-2}	7.90^{-2}	4.76^{-3}	7.22^{-3}	1.95^{-6}	1.19^{-1}
0.2307				[illegible]	3.86^{-2}	1.74^{-3}	7.40^{-3}	1.69^{-6}	7.83^{-2}
0.2204				2.58^{-2}	2.32^{-2}	3.64^{-2}	7.54^{-3}	1.48^{-6}	9.29^{-2}
0.2110				7.03^{-2}	5.81^{-2}	3.26^{-2}	8.23^{-3}	1.30^{-6}	1.69^{-1}
0.2024				3.38^{-2}	5.05^{-2}	3.02^{-4}	8.59^{-3}	1.13^{-6}	9.32^{-2}
0.1945					2.71^{-2}	7.42^{-4}	8.78^{-3}	1.01^{-6}	3.66^{-2}
0.1871						1.30^{-4}	8.96^{-3}	8.96^{-7}	9.09^{-3}
0.1803						2.74^{-3}	9.10^{-3}	8.02^{-7}	1.18^{-2}
0.1740						7.49^{-3}	9.24^{-3}	7.19^{-7}	1.67^{-2}
0.1681							9.42^{-3}	6.49^{-7}	9.42^{-3}
0.1626							9.61^{-3}	5.87^{-7}	9.61^{-3}
0.1574							9.74^{-3}	5.33^{-7}	9.74^{-3}
0.1526							9.88^{-3}	4.86^{-7}	9.88^{-3}
0.1480							1.01^{-2}	4.43^{-7}	1.01^{-2}
0.1437							1.02^{-2}	4.06^{-7}	1.02^{-2}
0.1397							1.03^{-2}	3.72^{-7}	1.03^{-2}
0.1359							1.05^{-2}	[illegible]43^{-7}	1.05^{-2}
0.1322							1.06^{-2}	3.16^{-7}	1.06^{-2}
0.1288							1.08^{-2}	2.91^{-7}	1.08^{-2}
0.1255							1.09^{-2}	2.70^{-7}	1.09^{-2}
0.1224							1.11^{-2}	2.51^{-7}	1.11^{-2}
0.1195							1.12^{-2}	2.33^{-7}	1.12^{-2}
0.1167							1.13^{-2}	2.17^{-7}	1.13^{-2}

Table 43

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : T = 8000°K and $\rho/\rho_o = 10^{-1}$

λ (μ)	$N_2(1^+)$	$N_2(2^+)$	$N_2^+(1^-)$	NO β	NO γ	O_2(S-R)	$\mu_{PD(O^-)}$	μ_{ff}	μ_{Total}
1.9837								4.94^{-5}	4.94^{-5}
1.4168								1.80^{-5}	1.80^{-5}
1.1020	1.44^{-4}							8.43^{-6}	1.52^{-4}
0.9016	2.38^{-4}							4.62^{-6}	2.43^{-4}
0.7630	2.65^{-4}						4.68^{-5}	2.79^{-6}	3.15^{-4}
0.6612	1.96^{-4}						5.70^{-5}	1.81^{-6}	2.55^{-4}
0.5834	1.06^{-4}		3.21^{-6}				6.20^{-5}	1.23^{-6}	1.72^{-4}
0.5220	2.28^{-5}		6.82^{-5}	7.01^{-6}			6.61^{-5}	8.85^{-7}	1.65^{-4}
0.4723		2.27^{-5}	5.26^{-4}	2.56^{-5}			6.86^{-5}	6.53^{-7}	6.44^{-4}
0.4312		7.67^{-5}	1.84^{-3}	9.47^{-5}		1.31^{-5}	7.12^{-5}	4.98^{-7}	2.10^{-3}
0.3967		3.01^{-4}	4.15^{-3}	7.27^{-5}		3.13^{-5}	7.17^{-5}	3.88^{-7}	4.63^{-3}
0.3673		7.60^{-4}	3.65^{-3}	1.70^{-4}		1.99^{-5}	7.25^{-5}	3.08^{-7}	4.61^{-3}
0.3420		7.03^{-4}	9.59^{-4}	2.18^{-4}	3.84^{-7}	6.07^{-5}	1.09^{-4}	2.49^{-7}	2.05^{-3}
0.3199		1.15^{-3}		2.69^{-4}	6.29^{-6}	4.95^{-5}	1.29^{-4}	2.03^{-7}	1.60^{-3}
0.3066		6.75^{-4}		4.17^{-4}	1.90^{-5}	7.90^{-5}	1.39^{-4}	1.69^{-7}	1.33^{-3}
0.2834		1.02^{-4}		4.23^{-4}	7.79^{-5}	9.26^{-5}	1.46^{-4}	1.41^{-7}	8.42^{-4}
0.2681				6.02^{-4}	1.83^{-4}	9.24^{-5}	1.52^{-4}	1.20^{-7}	1.03^{-3}
0.2543				9.84^{-4}	5.13^{-4}	1.16^{-4}	1.56^{-4}	1.02^{-7}	1.77^{-3}
0.2419				6.89^{-4}	1.92^{-3}	5.23^{-5}	1.60^{-4}	8.60^{-8}	2.82^{-3}
0.2307				7.45^{-4}	9.39^{-4}	1.91^{-5}	1.64^{-4}	7.62^{-8}	1.87^{-3}
0.2204				6.28^{-4}	5.65^{-4}	4.17^{-4}	1.67^{-4}	6.65^{-8}	1.78^{-3}
0.2110				1.71^{-3}	1.41^{-3}	3.58^{-4}	1.82^{-4}	5.84^{-8}	3.66^{-3}
0.2024				8.21^{-4}	1.23^{-3}	3.32^{-6}	1.90^{-4}	5.10^{-8}	2.24^{-3}
0.1945					6.59^{-4}	8.15^{-6}	1.94^{-4}	4.53^{-8}	8.62^{-4}
0.1871						1.43^{-6}	1.98^{-4}	4.04^{-8}	1.99^{-4}
0.1803						3.01^{-5}	2.01^{-4}	3.61^{-8}	2.31^{-4}
0.1740						8.23^{-5}	2.04^{-4}	3.24^{-8}	2.86^{-4}
0.1681							2.08^{-4}	2.92^{-8}	2.08^{-4}
0.1626							2.13^{-4}	2.64^{-8}	2.13^{-4}
0.1574							2.16^{-4}	2.40^{-8}	2.16^{-4}
0.1526							2.19^{-4}	2.19^{-8}	2.19^{-4}
0.1480							2.23^{-4}	2.00^{-8}	2.23^{-4}
0.1437							2.26^{-4}	1.83^{-8}	2.26^{-4}
0.1397							2.29^{-4}	1.68^{-8}	2.29^{-4}
0.1359							2.32^{-4}	1.55^{-8}	2.32^{-4}
0.1322							2.35^{-4}	1.43^{-8}	2.35^{-4}
0.1288							2.39^{-4}	1.31^{-8}	2.39^{-4}
0.1255							2.42^{-4}	1.22^{-8}	2.42^{-4}
0.1224							2.45^{-4}	1.13^{-8}	2.45^{-4}
0.1195							2.48^{-4}	1.05^{-8}	2.48^{-4}
0.1167							2.50^{-4}	9.77^{-9}	2.50^{-4}

Table 44

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : T = 8000°K and $\rho/\rho_o = 10^{-2}$

λ (μ)	$N_2(1^+)$	$N_2(2^+)$	$N_2^+(1^-)$	NO β	NO γ	O_2 (S-R)	$\mu_{PD(O^-)}$	μ_{ff}	μ_{Total}
1.9837								3.68^{-6}	3.68^{-6}
1.4168								1.34^{-6}	1.34^{-6}
1.1020	3.27^{-6}							6.28^{-7}	3.90^{-6}
0.9016	5.39^{-6}							3.44^{-7}	5.73^{-6}
0.7630	6.01^{-6}						1.30^{-6}	2.08^{-7}	7.52^{-6}
0.6612	4.46^{-6}						1.58^{-6}	1.35^{-7}	6.18^{-6}
0.5834	2.42^{-6}		2.64^{-7}				1.72^{-6}	9.20^{-8}	4.50^{-6}
0.5220	5.17^{-7}		5.62^{-6}	1.07^{-7}			1.84^{-6}	6.60^{-8}	8.15^{-6}
0.4723		5.15^{-7}	4.34^{-5}	3.90^{-7}			1.91^{-6}	4.86^{-8}	4.63^{-5}
0.4312		1.74^{-6}	1.52^{-4}	1.44^{-6}		1.34^{-7}	1.98^{-6}	3.71^{-8}	1.57^{-4}
0.3967		6.83^{-6}	3.42^{-4}	1.11^{-6}		3.21^{-7}	1.99^{-6}	2.89^{-8}	3.52^{-4}
0.3673		1.59^{-5}	3.01^{-4}	2.59^{-6}		2.04^{-7}	2.01^{-6}	2.29^{-8}	3.22^{-4}
0.3420		1.60^{-5}	7.90^{-5}	3.33^{-6}	5.86^{-9}	6.22^{-7}	3.02^{-6}	1.85^{-8}	1.02^{-4}
0.3199		2.62^{-5}		4.11^{-6}	9.60^{-8}	5.07^{-7}	3.59^{-6}	1.52^{-8}	3.45^{-5}
0.3006		1.53^{-5}		6.36^{-6}	2.91^{-7}	8.10^{-7}	3.87^{-6}	1.26^{-8}	2.66^{-5}
0.2834		2.31^{-6}		6.45^{-6}	1.19^{-6}	9.50^{-7}	4.07^{-6}	1.05^{-8}	1.50^{-5}
0.2681				9.19^{-6}	2.79^{-6}	9.48^{-7}	4.21^{-6}	8.91^{-9}	1.71^{-5}
0.2543				1.50^{-5}	7.83^{-6}	1.19^{-6}	4.32^{-6}	7.61^{-9}	2.83^{-5}
0.2419				1.05^{-5}	2.93^{-5}	5.36^{-7}	4.44^{-6}	6.55^{-9}	4.48^{-5}
0.2307				1.14^{-5}	1.43^{-5}	1.96^{-7}	4.55^{-6}	5.68^{-9}	3.04^{-5}
0.2204				9.58^{-6}	8.62^{-2}	4.28^{-6}	4.63^{-6}	4.95^{-9}	2.71^{-5}
0.2110				2.61^{-5}	2.16^{-5}	3.67^{-6}	5.06^{-6}	4.35^{-9}	5.64^{-5}
0.2024				1.25^{-5}	1.87^{-5}	3.40^{-8}	5.28^{-6}	3.80^{-9}	3.65^{-5}
0.1945					1.01^{-5}	8.36^{-8}	5.40^{-6}	3.37^{-9}	1.56^{-5}
0.1871						1.47^{-8}	5.51^{-6}	3.01^{-9}	5.52^{-6}
0.1803						3.09^{-7}	5.59^{-6}	2.69^{-9}	5.90^{-6}
0.1740						8.44^{-7}	5.68^{-6}	2.41^{-9}	6.53^{-6}
0.1681							5.79^{-6}	2.18^{-9}	5.79^{-6}
0.1626							5.90^{-6}	1.97^{-9}	5.90^{-6}
0.1574							5.99^{-6}	1.79^{-9}	5.99^{-6}
0.1526							6.07^{-6}	1.63^{-9}	6.07^{-6}
0.1480							6.19^{-6}	1.49^{-9}	6.19^{-6}
0.1437							6.27^{-6}	1.36^{-9}	6.27^{-6}
0.1397							6.36^{-6}	1.25^{-9}	6.36^{-6}
0.1359							6.44^{-6}	1.15^{-9}	6.44^{-6}
0.1322							6.53^{-6}	1.06^{-9}	6.53^{-6}
0.1288							6.64^{-6}	9.78^{-10}	6.64^{-6}
0.1255							6.72^{-6}	9.07^{-10}	6.72^{-6}
0.1224							6.81^{-6}	8.41^{-10}	6.81^{-6}
0.1195							6.89^{-6}	7.81^{-10}	6.89^{-6}
0.1167							6.95^{-6}	7.28^{-10}	6.95^{-6}

Table 45

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : T = 8000°K and $\rho/\rho_o = 10^{-3}$

λ (μ)	$N_2(1^+)$	$N_2(2^+)$	$N_2^+(1^-)$	NO β	NO γ	O_2(S-R)	$\mu_{PD(O^-)}$	μ_{ff}	μ_{Total}
1.9837								3.54^{-7}	3.54^{-7}
1.4168								1.29^{-7}	1.29^{-7}
1.1020	3.81^{-8}							6.04^{-8}	9.85^{-8}
0.9016	6.29^{-8}							3.31^{-8}	9.60^{-8}
0.7630	7.01^{-8}						4.01^{-8}	2.00^{-8}	1.30^{-7}
0.6612	5.20^{-8}						4.88^{-8}	1.30^{-8}	1.14^{-7}
0.5834	2.82^{-8}		9.98^{-9}				5.32^{-8}	8.85^{-9}	1.00^{-7}
0.5220	6.03^{-9}		2.12^{-7}	1.15^{-9}			5.67^{-8}	6.35^{-9}	2.82^{-7}
0.4723		6.00^{-9}	1.64^{-6}	4.20^{-9}			5.89^{-8}	4.68^{-9}	1.71^{-6}
0.4312		2.03^{-8}	5.73^{-6}	1.55^{-8}		1.33^{-9}	6.10^{-8}	3.57^{-9}	5.83^{-6}
0.3967		7.96^{-8}	1.29^{-5}	1.19^{-8}		3.19^{-9}	6.15^{-8}	2.78^{-9}	1.31^{-5}
0.3673		1.85^{-7}	1.14^{-5}	2.79^{-8}		2.03^{-9}	6.22^{-8}	2.21^{-9}	1.17^{-5}
0.3420		1.86^{-7}	2.99^{-6}	3.58^{-8}	6.31^{-11}	6.18^{-9}	9.33^{-8}	1.78^{-9}	3.31^{-6}
0.3199		3.05^{-7}		4.42^{-8}	1.03^{-9}	5.04^{-9}	1.11^{-7}	1.46^{-9}	4.68^{-7}
0.3006		1.79^{-7}		6.84^{-8}	3.12^{-9}	8.05^{-9}	1.19^{-7}	1.21^{-9}	3.79^{-7}
0.2834		2.69^{-8}		6.94^{-8}	1.28^{-8}	9.44^{-9}	1.26^{-7}	1.01^{-9}	2.46^{-7}
0.2681				9.88^{-8}	3.00^{-8}	9.42^{-9}	1.30^{-7}	8.57^{-10}	2.69^{-7}
0.2543				1.62^{-7}	8.42^{-8}	1.19^{-6}	1.33^{-7}	7.32^{-10}	3.92^{-7}
0.2419				1.13^{-7}	3.15^{-7}	5.33^{-9}	1.37^{-7}	6.31^{10}	5.71^{-7}
0.2307				1.22^{-7}	1.54^{-7}	1.95^{-9}	1.40^{-7}	5.47^{-10}	4.18^{-7}
0.2204				1.03^{-7}	9.27^{-8}	4.25^{-8}	1.43^{-7}	4.77^{-10}	3.82^{-7}
0.2110				2.81^{-7}	2.32^{-7}	3.65^{-8}	1.56^{-7}	4.19^{-10}	7.06^{-7}
0.2024				1.35^{-7}	2.02^{-7}	3.38^{-10}	1.63^{-7}	3.66^{-10}	5.01^{-7}
0.1945					1.08^{-7}	8.31^{-10}	1.67^{-7}	3.25^{-10}	2.76^{-7}
0.1871						1.46^{-10}	1.70^{-7}	2.89^{-10}	1.70^{-7}
0.1803						3.07^{-9}	1.73^{-7}	2.59^{-10}	1.76^{-7}
0.1740						8.39^{-9}	1.75^{-7}	2.32^{-10}	1.84^{-7}
0.1681							1.79^{-7}	2.10^{-10}	1.79^{-7}
0.1626							1.82^{-7}	1.90^{-10}	1.82^{-7}
0.1574							1.85^{-7}	1.72^{-10}	1.85^{-7}
0.1526							1.88^{-7}	1.57^{-10}	1.88^{-7}
0.1480							1.91^{-7}	1.43^{-10}	1.91^{-7}
0.1437							1.94^{-7}	1.31^{-10}	1.94^{-7}
0.1397							1.96^{-7}	1.20^{-10}	1.96^{-7}
0.1359							1.99^{-7}	1.11^{-10}	1.99^{-7}
0.1322							2.01^{-7}	1.02^{-10}	2.01^{-7}
0.1288							2.05^{-7}	9.41^{-11}	2.05^{-7}
0.1255							2.08^{-7}	8.73^{-11}	2.08^{-7}
0.1224							2.10^{-7}	8.09^{-11}	2.10^{-7}
0.1195							2.13^{-7}	7.51^{-11}	2.13^{-7}
0.1167							2.15^{-7}	7.01^{-11}	2.15^{-7}

Table 46

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : $T = 8000^{o}K$ and $\rho/\rho_o = 10^{-4}$

λ (μ)	$N_2(1^+)$	$N_2(2^+)$	$N_2^+(1^-)$	NO β	NO γ	O_2 (S - R)	$\mu_{PD(O^-)}$	μ_{ff}	μ_{Total}
1.9837								3.44^{-8}	3.44^{-8}
1.4168								1.25^{-8}	1.25^{-8}
1.1020	3.72^{-10}							5.88^{-9}	6.25^{-9}
0.9016	6.13^{-10}							3.22^{-9}	3.83^{-9}
0.7630	6.33^{-10}						1.23^{-9}	1.94^{-9}	3.85^{-9}
0.6612	5.07^{-10}						1.50^{-9}	1.26^{-9}	3.27^{-9}
0.5834	2.75^{-10}		3.12^{-10}				1.63^{-9}	8.61^{-10}	3.08^{-9}
0.5220	5.88^{-11}		6.64^{-9}	1.12^{-11}			1.74^{-9}	6.17^{-10}	9.07^{-9}
0.4723		5.85^{-11}	5.12^{-8}	4.08^{-11}			1.81^{-9}	4.55^{-10}	5.36^{-8}
0.4312		1.98^{-10}	1.79^{-7}	1.51^{-10}		1.29^{-11}	1.88^{-9}	3.47^{-10}	1.82^{-7}
0.3967		7.77^{-10}	4.04^{-7}	1.16^{-10}		3.09^{-11}	1.89^{-9}	2.70^{-10}	4.07^{-7}
0.3673		1.81^{-9}	3.55^{-7}	2.71^{-10}		1.96^{-11}	1.91^{-9}	2.15^{-10}	3.59^{-7}
0.3420		1.82^{-9}	9.34^{-8}	3.49^{-10}	6.13^{-13}	5.99^{-11}	2.87^{-9}	1.73^{-10}	9.87^{-8}
0.3199		2.98^{-9}		4.30^{-10}	1.00^{-11}	4.88^{-11}	3.40^{-9}	1.42^{-10}	7.01^{-9}
0.3006		1.74^{-9}		6.65^{-10}	3.04^{-11}	7.80^{-11}	3.67^{-9}	1.18^{-10}	6.30^{-9}
0.2834		2.62^{-10}		6.75^{-10}	1.24^{-10}	9.14^{-11}	3.86^{-9}	9.85^{-11}	5.11^{-9}
0.2681				9.61^{-10}	2.92^{-10}	9.12^{-11}	3.99^{-9}	8.34^{-11}	5.42^{-9}
0.2543				1.57^{-9}	8.19^{-10}	1.15^{-11}	4.10^{-9}	7.12^{-11}	6.68^{-9}
0.2419				1.10^{-9}	3.07^{-9}	5.16^{-11}	4.21^{-9}	6.13^{-11}	8.49^{-9}
0.2307				1.19^{-9}	1.50^{-9}	1.89^{-11}	4.31^{-9}	5.31^{-11}	7.07^{-9}
0.2204				1.00^{-9}	9.01^{-10}	4.13^{-10}	4.40^{-9}	4.64^{-11}	[illegible] 76^{-9}
0.2110				2.73^{-9}	2.26^{-9}	3.54^{-10}	4.80^{-9}	4.07^{-11}	1.02^{-8}
0.2024				1.31^{-9}	1.96^{-9}	3.28^{-12}	5.01^{-9}	3.56^{-11}	8.32^{-9}
0.1945					1.05^{-9}	8.05^{-12}	5.12^{-9}	3.16^{-11}	6.21^{-9}
0.1871						1.41^{-12}	5.23^{-9}	2.81^{-11}	5.26^{-9}
0.1803						2.97^{-11}	5.31^{-9}	2.52^{-11}	5.36^{-9}
0.1740						8.13^{-11}	5.39^{-9}	2.26^{-11}	5.49^{-9}
0.1681							5.49^{-9}	2.04^{-11}	5.51^{-9}
0.1626							5.60^{-9}	1.84^{-11}	5.62^{-9}
0.1574							5.68^{-9}	1.68^{-11}	5.70^{-9}
0.1526							5.76^{-9}	1.53^{-11}	5.78^{-9}
0.1480							5.87^{-9}	1.39^{-11}	5.88^{-9}
0.1437							5.95^{-9}	1.27^{-11}	5.96^{-9}
0.1397							6.03^{-9}	1.17^{-11}	6.04^{-9}
0.1359							6.11^{-9}	1.08^{-11}	6.12^{-9}
0.1322							6.19^{-9}	9.93^{-12}	6.20^{-9}
0.1288							6.30^{-9}	9.15^{-12}	6.31^{-9}
0.1255							6.38^{-9}	8.48^{-12}	6.39^{-9}
0.1224							6.46^{-9}	7.87^{-12}	6.47^{-9}
0.1195							6.54^{-9}	7.30^{-12}	6.55^{-9}
0.1167							6.59^{-9}	6.81^{-12}	6.60^{-9}

Table 47

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : T = 8000°K and $\rho/\rho_o = 10^{-5}$

λ (μ)	$N_2(1^+)$	$N_2(2^+)$	$N_2^+(1^-)$	NO β	NO γ	O_2(S-R)	$\mu_{PD(O^-)}$	μ_{ff}	μ_{Total}
1.9837								3.23^{-9}	3.23^{-9}
1.4168								1.17^{-9}	1.17^{-9}
1.1020	3.26^{-12}							5.52^{-10}	5.55^{-10}
0.9016	5.38^{-12}							3.02^{-10}	3.07^{-10}
0.7630	5.99^{-12}						3.57^{-11}	1.82^{-10}	2.24^{-10}
0.6612	4.44^{-12}						4.34^{-11}	1.18^{-10}	1.66^{-10}
0.5834	2.41^{-12}		8.95^{-12}				4.73^{-11}	8.08^{-11}	1.39^{-10}
0.5220	5.16^{-13}		1.90^{-10}	9.95^{-14}			5.04^{-11}	5.79^{-11}	2.99^{-10}
0.4723		5.13^{-13}	1.47^{-9}	3.63^{-13}			5.24^{-11}	4.27^{-11}	1.57^{-9}
0.4312		1.74^{-12}	5.14^{-9}	1.34^{-12}		1.16^{-13}	5.43^{-11}	3.26^{-11}	5.23^{-9}
0.3967		6.81^{-12}	1.16^{-8}	1.03^{12}		2.78^{-13}	5.47^{-11}	2.54^{-11}	1.17^{-8}
0.3673		1.58^{-11}	1.02^{-8}	2.41^{-12}		1.76^{-13}	5.53^{-11}	2.01^{-11}	1.03^{-8}
0.3420		1.59^{-11}	2.68^{-9}	3.10^{-12}	5.45^{-15}	5.38^{-13}	8.30^{-11}	1.63^{-11}	2.80^{-9}
0.3199		2.61^{-11}		3.82^{-12}	8.92^{-14}	4.39^{-13}	9.85^{-11}	1.33^{-11}	1.42^{-10}
0.3006		1.53^{-11}		5.91^{-12}	2.70^{-13}	7.01^{-13}	1.06^{-10}	1.10^{-11}	1.39^{-10}
0.2834		2.30^{-12}		[illegible]9^{-12}	1.10^{-12}	8.22^{-13}	1.12^{-10}	9.24^{-12}	1.31^{-10}
0.2681				8.54^{-12}	2.59^{-12}	8.20^{-13}	1.16^{-10}	7.82^{-12}	1.36^{-10}
0.2543				1.40^{-11}	7.28^{-12}	1.03^{-12}	1.19^{-10}	6.68^{-12}	1.48^{-10}
0.2419				9.77^{-12}	2.73^{-11}	4.64^{-13}	1.22^{-10}	5.76^{-12}	1.65^{-10}
0.2307				1.06^{-11}	1.33^{-11}	1.70^{-13}	1.25^{-10}	4.99^{-12}	1.59^{-10}
0.2204				8.90^{-12}	8.01^{-12}	3.71^{-12}	1.27^{-10}	4.35^{-12}	1.52^{-10}
0.2110				2.42^{-11}	2.00^{-11}	3.18^{-12}	1.39^{-10}	3.82^{-12}	1.90^{-10}
0.2024				1.16^{-11}	1.74^{-11}	2.94^{-14}	1.45^{-10}	3.34^{-12}	1.77^{-10}
0.1945					9.35^{-12}	7.23^{-14}	1.48^{-10}	2.96^{-12}	1.60^{-10}
0.1871						1.27^{-14}	1.51^{-10}	2.64^{-12}	1.55^{-10}
0.1803						2.67^{-13}	1.54^{-10}	2.36^{-12}	1.57^{-10}
0.1740						7.30^{-13}	1.56^{-10}	2.12^{-12}	1.59^{-10}
0.1681							1.59^{-10}	1.91^{-12}	1.61^{-10}
0.1626							1.62^{-10}	1.73^{-12}	1.64^{-10}
0.1574							1.64^{-10}	1.57^{-12}	1.66^{-10}
0.1526							1.67^{-10}	1.43^{-12}	1.68^{-10}
0.1480							1.70^{-10}	1.31^{-12}	1.71^{-10}
0.1437							1.72^{-10}	1.20^{-12}	1.73^{-10}
0.1397							1.75^{-10}	1.10^{-12}	1.76^{-10}
0.1359							1.77^{-10}	1.01^{-12}	1.78^{-10}
0.1322							1.79^{-10}	9.32^{-13}	1.80^{-10}
0.1288							1.82^{-10}	8.59^{-13}	1.83^{-10}
0.1255							1.85^{-10}	7.96^{-13}	1.86^{-10}
0.1224							1.87^{-10}	7.39^{-13}	1.88^{-10}
0.1195							1.89^{-10}	6.86^{-13}	1.90^{-10}
0.1167							1.91^{-10}	6.39^{-13}	1.92^{-10}

Table 48

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : T = 8000^{o}K and ρ/ρ_o = 10^{-6}

λ (μ)	$N_2(1^+)$	$N_2(2^+)$	$N_2^+(1^-)$	NO β	NO γ	O_2(S - R)	$\mu_{PD(O^-)}$	μ_{ff}	μ_{Total}
1.9837								2.63^{-10}	2.63^{-10}
1.4168								9.57^{-11}	9.57^{-11}
1.1020	2.14^{-14}							4.49^{-11}	4.49^{-11}
0.9016	3.53^{-14}							2.46^{-11}	2.46^{-11}
0.7630	3.93^{-14}						8.62^{-13}	1.49^{-11}	1.58^{-11}
0.6612	2.92^{-14}						1.05^{-12}	9.64^{-12}	1.07^{-11}
0.5834	1.58^{-14}		2.05^{-13}				1.14^{-12}	6.58^{-12}	7.94^{-12}
0.5220	3.38^{-15}		4.36^{-12}	6.77^{-15}			1.22^{-12}	4.72^{-12}	1.03^{-11}
0.4723		3.37^{-15}	3.37^{-11}	2.47^{-14}			1.26^{-12}	3.48^{-12}	3.85^{-11}
0.4312		1.14^{-14}	1.18^{10}	9.14^{-14}		8.22^{-16}	1.31^{-12}	2.65^{-12}	1.22^{-10}
0.3967		4.47^{-14}	2.66^{-10}	7.02^{-14}		1.97^{-15}	1.32^{-12}	2.07^{-12}	2.69^{-10}
0.3673		1.04^{-13}	2.33^{-10}	1.64^{-13}		1.25^{-15}	1.34^{-12}	1.64^{-12}	2.36^{-10}
0.3420		1.04^{-13}	6.14^{-11}	2.11^{-13}	3.71^{-16}	3.81^{-15}	2.00^{-12}	1.33^{-12}	6.50^{-11}
0.3199		1.71^{-13}		2.60^{-13}	6.07^{-15}	3.11^{-15}	2.38^{-12}	1.08^{-12}	3.90^{-12}
0.3006		1.00^{-13}		4.02^{-13}	1.84^{-14}	4.96^{-15}	2.57^{-12}	8.99^{-13}	3.99^{-12}
0.2834		1.51^{-14}		4.08^{-13}	7.51^{-14}	5.82^{-15}	2.70^{-12}	7.53^{-13}	3.96^{-12}
0.2681				5.81^{-13}	1.76^{-13}	5.81^{-15}	2.79^{-12}	6.37^{-13}	4.19^{-12}
0.2543				9.50^{-13}	4.95^{-13}	7.32^{-15}	2.87^{-12}	5.44^{-13}	4.87^{-12}
0.2419				6.65^{-13}	1.85^{-12}	3.29^{-15}	2.94^{-12}	4.69^{-13}	5.93^{-12}
0.2307				7.20^{-13}	9.06^{-13}	1.20^{-15}	3.02^{-12}	4.06^{-13}	5.05^{-12}
0.2204				6.06^{-13}	5.45^{-13}	2.51^{-14}	3.07^{-12}	3.54^{-13}	4.60^{-12}
0.2116				1.65^{-12}	1.36^{-12}	2.25^{-14}	3.35^{-12}	3.11^{-13}	6.69^{-12}
0.2024				7.93^{-13}	1.19^{-12}	2.09^{-16}	3.50^{-12}	2.72^{-13}	5.76^{-12}
0.1945					6.36^{-13}	5.12^{-16}	3.58^{-12}	2.41^{-13}	4.46^{-12}
0.1871						8.98^{-17}	3.65^{-12}	2.15^{-13}	3.87^{-12}
0.1803						1.89^{-15}	3.71^{-12}	1.93^{-13}	3.90^{-12}
0.1740						5.17^{-15}	3.76^{-12}	1.73^{-13}	3.94^{-12}
0.1681							3.84^{-12}	1.56^{-13}	4.00^{-12}
0.1626							3.91^{-12}	1.41^{-13}	4.05^{-12}
0.1574							3.97^{-12}	1.28^{-13}	4.10^{-12}
0.1526							4.03^{-12}	1.17^{-13}	4.15^{-12}
0.1480							4.10^{-12}	1.06^{-13}	4.21^{-12}
0.1437							4.16^{-12}	9.74^{-14}	4.26^{-12}
0.1397							4.21^{-12}	8.93^{-14}	4.30^{-12}
0.1359							4.27^{-12}	8.23^{-14}	4.35^{-12}
0.1322							4.33^{-12}	7.60^{-14}	4.41^{-12}
0.1288							4.40^{-12}	6.99^{-14}	4.47^{-12}
0.1255							4.46^{-12}	6.49^{-14}	4.52^{-12}
0.1224							4.51^{-12}	6.02^{-14}	4.57^{-12}
0.1195							4.57^{-12}	5.58^{-14}	4.63^{-12}
0.1167							4.61^{-12}	5.21^{-14}	4.66^{-12}

Table 49

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : T = 12,000°K and ρ/ρ_o = 10

λ (μ)	$N_2(1^+)$	$N_2(2^+)$	$N_2^+(1^-)$	NO β	NO γ	O_2 (S - R)	$\mu_{PD(O^-)}$	μ_{ff}	$\mu_{PE(N)}$	$\mu_{PE(O)}$	μ_{Total}
1.9837								5.46	6.51^{-2}	0	5.53
1.4168								1.99	3.96^{-1}	1.246^{-1}	2.52
1.1020	6.29^{-1}							9.39^{-1}	6.20^{-2}	1.524^{-1}	1.78
0.9016	1.12							5.14^{-1}	4.48^{-1}	1.075^{-1}	2.19
0.7630	1.39						4.13^{-1}	3.09^{-1}	6.71^{-1}	1.103^{-1}	2.89
0.6612	1.29						5.03^{-1}	2.01^{-1}	5.04^{-1}	1.290^{-1}	2.63
0.5834	8.46^{-1}		2.85^{-3}				5.48^{-1}	1.37^{-1}	3.62^{-1}	9.61^{-2}	1.99
0.5220	1.67^{-1}		5.82^{-2}	1.18^{-2}			5.84^{-1}	9.81^{-2}	3.15^{-1}	6.888^{-2}	1.30
0.4723		9.88^{-2}	4.18^{-1}	3.73^{-2}			6.07^{-1}	7.24^{-2}	3.72^{-1}	7.186^{-2}	1.68
0.4312		3.06^{-1}	1.24	1.10^{-1}		2.97^{-2}	6.29^{-1}	5.49^{-2}	5.31^{-1}	1.094^{-1}	3.01
0.3967		9.59^{-1}	2.30	7.33^{-2}		6.23^{-2}	6.34^{-1}	4.28^{-2}	4.39^{-1}	1.155^{-1}	4.63
0.3673		1.84	2.20	1.47^{-1}		3.52^{-2}	6.41^{-1}	3.40^{-2}	3.48^{-1}	9.155^{-2}	5.34
0.3420		1.55	6.02^{-1}	1.72^{-3}	2.38^{-4}	9.73^{-2}	9.62^{-1}	2.74^{-2}	2.91^{-2}	7.387^{-2}	3.30
0.3199		2.72		1.89^{-1}	3.83^{-3}	6.73^{-2}	1.14^{-1}	2.24^{-2}	3.10^{-1}	6.045^{-2}	4.51
0.3006		1.60		2.62^{-1}	1.20^{-2}	9.82^{-2}	1.23^{-1}	1.86^{-2}	3.40^{-1}	6.353^{-2}	3.62
0.2834		2.32^{-1}		2.34^{-1}	4.25^{-2}	1.03^{-1}	1.29^{-1}	1.56^{-2}	5.19^{-1}	7.128^{-2}	2.51
0.2681				2.96^{-1}	9.15^{-2}	9.37^{-2}	1.34^{-1}	1.32^{-2}	4.39^{-1}	7.435^{-2}	2.34
0.2543				4.60^{-1}	2.25^{-1}	1.05^{-1}	1.38^{-1}	1.12^{-2}	3.74^{-1}	1.142^{-1}	2.67
0.2419				2.91^{-1}	6.66^{-1}	4.21^{-2}	1.41^{-1}	9.67^{-3}	2.78^{-1}	9.832^{-2}	2.80
0.2307				2.90^{-1}	2.89^{-1}	1.41^{-2}	1.45^{-1}	8.38^{-3}	2.79^{-1}	8.517^{-2}	2.41
0.2204				2.33^{-1}	1.99^{-1}	2.87^{-1}	1.47^{-1}	7.34^{-3}	2.44^{-1}	7.441^{-2}	2.51
0.2110				5.92^{-1}	4.20^{-1}	2.38^{-1}	1.61^{-1}	6.48^{-3}	2.15^{-1}	6.525^{-2}	3.15
0.2024				2.66^{-1}	3.63^{-1}	1.88^{-3}	1.68^{-1}	5.71^{-3}	1.89^{-1}	5.762^{-2}	2.57
0.1945					1.90^{-1}	4.22^{-3}	1.72^{-1}	5.06^{-3}	1.68^{-1}	5.107^{-2}	2.14
0.1871						6.76^{-4}	1.75^{-1}	4.50^{-3}	1.49^{-1}	4.556^{-2}	1.94
0.1803						1.41^{-2}	1.78^{-1}	4.01^{-3}	1.34^{-1}	4.069^{-2}	1.97
0.1740						3.88^{-2}	1.81^{-1}	3.58^{-3}	1.20^{-1}	3.662^{-2}	2.01
0.1681							1.84^{-1}	3.21^{-3}	1.08^{-1}	3.30^{-2}	1.98
0.1626							1.88^{-1}	2.88^{-3}	9.80^{-2}	2.988^{-2}	2.01
0.1574							1.91^{-1}	2.59^{-3}	8.89^{-2}	2.714^{-2}	2.03
0.1526							1.93^{-1}	2.36^{-3}	8.09^{-2}	2.676^{-2}	2.04
0.1480							1.97^{-1}	2.15^{-3}	7.40^{-2}	2.257^{-2}	2.07
0.1437							2.00^{-1}	1.97^{-3}	6.77^{-2}	2.062^{-2}	2.09
0.1397							2.02^{-1}	1.81^{-3}	6.21^{-2}	1.894^{-1}	2.27
0.1359							2.05^{-1}	1.67^{-3}	5.71^{-2}	1.741^{-1}	2.28
0.1322							2.08^{-1}	1.54^{-3}	5.27^{-2}	6.561^{-1}	2.79
0.1288							2.11^{-1}	1.42^{-3}	4.86^{-2}	8.578^{-1}	3.02
0.1255							2.14^{-1}	1.31^{-3}	4.51^{-2}	7.947^{-1}	2.99
0.1224							2.17^{-1}	1.22^{-3}	4.18^{-2}	7.378^{-1}	2.95
0.1195							2.19^{-1}	1.13^{-3}	3.87^{-2}	5.859^{-1}	2.92
0.1167							2.21^{-1}	1.06^{-3}	3.62^{-2}	6.380^{-1}	2.89

Table 50

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : T = 12,000°K and $\rho/\rho_o = 1$

λ (μ)	$N_2(1^+)$	$N_2(2^+)$	$N_2^+(1^-)$	NO β	NO γ	O_2 (S-R)	$\mu_{PD(O^-)}$	μ_{ff}	$\mu_{PE(N)}$	$\mu_{PE(O)}$	μ_{Total}
1.9837								5.25^{-1}	9.28^{-3}	0	5.30^{-1}
1.4168								1.91^{-1}	5.64^{-2}	1.313^{-2}	2.60^{-1}
1.1020	1.28^{-2}							8.99^{-2}	8.84^{-2}	1.606^{-2}	1.28^{-1}
0.9016	2.27^{-2}							4.92^{-2}	6.38^{-2}	1.133^{-2}	1.47^{-1}
0.7630	2.81^{-2}						1.35^{-2}	2.96^{-2}	9.56^{-2}	1.163^{-2}	1.79^{-1}
0.6612	2.62^{-2}						1.64^{-2}	1.63^{-2}	7.18^{-2}	1.360^{-2}	1.48^{-1}
0.583[illegible]	1.72^{-2}		1.88^{-4}				1.78^{-2}	1.31^{-2}	5.16^{-2}	1.013^{-2}	1.10^{-1}
0.5220	3.39^{-3}		3.83^{-3}	1.77^{-4}			1.90^{-2}	9.39^{-3}	4.49^{-2}	7.260^{-3}	8.80^{-2}
0.4723		2.00^{-3}	2.75^{-2}	5.60^{-4}			1.98^{-2}	6.93^{-3}	5.30^{-2}	7.574^{-3}	1.18^{-1}
0.4312		6.21^{-3}	8.15^{-2}	1.65^{-3}		3.30^{-4}	2.05^{-2}	5.26^{-3}	7.57^{-2}	$1\ 153^{-2}$	2.03^{-1}
0.3967		1.94^{-2}	1.51^{-1}	1.10^{-3}		6.92^{-4}	2.06^{-2}	4.10^{-3}	6.26^{-2}	1.217^{-2}	2.72^{-1}
0.3673		3.73^{-2}	1.44^{-1}	2.20^{-3}		3.91^{-4}	2.09^{-2}	3.25^{-3}	4.96^{-2}	9.649^{-3}	2.68^{-1}
0.3420		3.14^{-2}	3.96^{-2}	2.58^{-3}	3.57^{-6}	1.08^{-3}	3.13^{-2}	2.63^{-3}	4.15^{-2}	7.786^{-3}	1.58^{-1}
0.3199		5.52^{-2}		2.84^{-3}	5.75^{-5}	7.47^{-4}	3.72^{-2}	2.15^{-3}	4.42^{-2}	6.371^{-3}	1.48^{-1}
0.3006		3.26^{-2}		3.93^{-3}	1.81^{-4}	1.09^{-3}	4.01^{-2}	1.78^{-3}	4.85^{-2}	6.696^{-3}	1.35^{-1}
0.2834		4.71^{-3}		3.50^{-3}	6.38^{-4}	1.14^{-3}	4.21^{-2}	1.49^{-3}	7.40^{-2}	7.513^{-3}	1.36^{-1}
0.2681				4.45^{-3}	1.37^{-3}	1.04^{-3}	4.36^{-2}	1.26^{-3}	6.26^{-2}	7.837^{-3}	1.22^{-1}
0.2543				6.90^{-3}	$3\ 38^{-3}$	1.17^{-3}	4.48^{-2}	1.08^{-3}	5.33^{-2}	1.204^{-2}	1.23^{-1}
0.2419				4.36^{-3}	9.99^{-3}	4.67^{-4}	4.59^{-2}	9.26^{-4}	3.96^{-2}	1.036^{-2}	1.11^{-1}
0.2307				4.34^{-3}	4.33^{-3}	1.57^{-4}	4.71^{-2}	8.03^{-4}	3.98^{-2}	8.977^{-3}	1.06^{-1}
0.2204				3.50^{-3}	2.98^{-3}	3.18^{-3}	4.80^{-2}	7.03^{-4}	3.48^{-2}	7.843^{-3}	1.01^{-1}
0.2110				8.88^{-3}	6.30^{-3}	2.64^{-3}	5.24^{-2}	6.20^{-4}	[illegible].06 $^{-2}$	6.877^{-3}	1.08^{-1}
0.2024				3.99^{-3}	5.44^{-3}	2.09^{-5}	5.47^{-2}	5.47^{-4}	2.69^{-2}	6.073^{-3}	9.77^{-2}
0.1945					2.85^{-3}	4.68^{-5}	5.59^{-2}	4.85^{-4}	2.39^{-2}	5.383^{-3}	8.86^{-2}
0.1871						7.50^{-6}	5.71^{-2}	4.31^{-4}	2.12^{-2}	4.802^{-3}	8.35^{-2}
0.1803						1.57^{-4}	5.79^{-2}	3.84^{-4}	1.91^{-2}	4.289^{-3}	8.18^{-2}
0.1740						4.31^{-4}	5.88^{-2}	3.43^{-4}	1.71^{-2}	3.860^{-3}	8.06^{-2}
0.1681							6.00^{-2}	3.08^{-4}	1.54^{-2}	3.478^{-3}	7.92^{-2}
0.1626							6.12^{-2}	2.76^{-4}	1.40^{-2}	3.149^{-3}	7.87^{-2}
0.1574							6.20^{-2}	2.48^{-4}	1.27^{-2}	2.861^{-3}	7.78^{-2}
0.1526							6.29^{-2}	2.26^{-4}	1.15^{-2}	2.821^{-3}	7.74^{-2}
0.1480							6.41^{-2}	2.06^{-4}	1.05^{-2}	2.379^{-3}	7.72^{-2}
0.1437							6.50^{-2}	1.89^{-4}	9.65^{-2}	2.173^{-3}	7.70^{-2}
0.1397							6.58^{-2}	1.73^{-4}	8.85^{-3}	1.996^{-3}	7.68^{-2}
0.1359							6.67^{-2}	1.60^{-4}	8.14^{-3}	1.835^{-2}	9.34^{-2}
0.1322							6.76^{-2}	1.47^{-4}	7.51^{-3}	6.915^{-2}	1.45^{-1}
0.1288							6.88^{-2}	1.36^{-4}	6.93^{-3}	9.041^{-2}	1.66^{-1}
0.1255							6.96^{-2}	1.26^{-4}	6.43^{-3}	8.376^{-2}	1.60^{-1}
0.1224							7.05^{-2}	1.17^{-4}	5.96^{-3}	7.776^{-2}	1.54^{-1}
0.1195							7.14^{-2}	1.08^{-4}	5.54^{-3}	7.229^{-2}	1.44^{-1}
0.1167							7.20^{-2}	1.01^{-4}	5.16^{-3}	6.725^{-2}	1.45^{-1}

Table 51

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : T = 12,000°K and $\rho/\rho_o = 10^{-1}$

λ (μ)	$N_2(1^+)$	$N_2(2^+)$	$N_2^+(1^-)$	NO β	NO γ	O_2(S-R)	$\mu_{PD(O^-)}$	μ_{ff}	$\mu_{PE(N)}$	$\mu_{PE(O)}$	μ_{Total}
1.9837								5.07^{-2}	9.63^{-4}	0	5.17^{-2}
1.4168								1.85^{-2}	5.86^{-3}	1.303^{-3}	2.57^{-2}
1.1020	1.38^{-4}							8.71^{-3}	9.17^{-4}	1.594^{-3}	1.14^{-2}
0.9016	2.45^{-4}							4.76^{-3}	6.63^{-3}	1.125^{-3}	1.27^{-2}
0.7630	3.03^{-4}						4.16^{-4}	2.87^{-3}	9.92^{-3}	1.154^{-3}	1.47^{-2}
0.6612	2.83^{-4}						5.06^{-4}	1.87^{-3}	7.45^{-3}	1.349^{-3}	1.15^{-2}
0.5834	1.85^{-4}		6.46^{-6}				5.52^{-4}	1.27^{-3}	5.35^{-3}	1.005^{-3}	8.37^{-3}
0.5220	3.66^{-5}		1.32^{-4}	1.82^{-6}			5.88^{-4}	9.15^{-4}	4.66^{-3}	7.205^{-4}	7.05^{-3}
0.4723		2.16^{-5}	9.48^{-4}	5.75^{-6}			6.10^{-4}	6.71^{-4}	5.50^{-3}	7.517^{-4}	8.51^{-3}
0.4312		6.70^{-5}	2.81^{-3}	1.70^{-5}		3.25^{-6}	6.33^{-4}	5.09^{-4}	2.85^{-3}	1.144^{-3}	1.30^{-2}
0.3967		2.10^{-4}	5.21^{-3}	1.13^{-5}		6.81^{-6}	6.37^{-4}	3.97^{-4}	6.49^{-3}	1.208^{-3}	1.42^{-2}
0.3673		4.02^{-5}	4.97^{-3}	2.26^{-5}		3.85^{-6}	6.45^{-4}	3.15^{-4}	5.15^{-3}	9.576^{-4}	1.24^{-2}
0.3420		3.38^{-4}	1.36^{-3}	2.66^{-5}	3.67^{-8}	1.06^{-5}	9.67^{-4}	2.54^{-4}	4.30^{-3}	7.727^{-4}	8.03^{-3}
0.3199		5.95^{-4}		2.92^{-5}	5.91^{-7}	7.35^{-6}	1.15^{-3}	2.08^{-4}	4.58^{-3}	6.323^{-4}	7.46^{-3}
0.3006		3.51^{-4}		4.04^{-5}	1.86^{-6}	1.07^{-5}	1.24^{-3}	1.72^{-4}	5.03^{-3}	6.645^{-4}	7.52^{-3}
0.2834		5.08^{-5}		3.60^{-5}	6.55^{-6}	1.12^{-5}	1.30^{-3}	1.44^{-4}	7.68^{-3}	7.456^{-4}	9.93^{-3}
0.2681				4.57^{-5}	1.41^{-5}	1.02^{-5}	1.35^{-3}	1.22^{-4}	6.49^{-3}	7.777^{-4}	8.81^{-3}
0.2543				7.09^{-5}	3.47^{-5}	1.15^{-5}	1.38^{-3}	1.04^{-4}	5.53^{-3}	1.195^{-3}	8.33^{-3}
0.2419				4.48^{-5}	1.03^{-4}	4.60^{-6}	1.42^{-3}	8.97^{-5}	4.11^{-3}	1.023^{-3}	6.80^{-3}
0.2307				4.46^{-5}	4.45^{-5}	1.54^{-6}	1.46^{-3}	7.77^{-5}	4.13^{-3}	8.909^{-4}	6.65^{-3}
0.2204				3.60^{-5}	3.06^{-5}	3.13^{-5}	1.48^{-3}	6.81^{-5}	3.61^{-3}	7.733^{-4}	6.04^{-3}
0.2110				9.12^{-5}	6.47^{-5}	2.60^{-5}	1.62^{-3}	6.01^{-5}	3.18^{-3}	6.825^{-4}	5.72^{-3}
0.2024				4.10^{-5}	5.59^{-5}	2.06^{-7}	1.69^{-3}	5.30^{-5}	2.80^{-3}	6.027^{-4}	5.24^{-3}
0.1945					2.93^{-5}	4.61^{-7}	1.73^{-3}	4.70^{-5}	2.48^{-3}	5.342^{-4}	4.82^{-3}
0.1871						7.38^{-8}	1.76^{-3}	4.18^{-5}	2.20^{-3}	4.766^{-4}	4.48^{-3}
0.1803						1.54^{-6}	1.79^{-3}	3.72^{-5}	1.98^{-3}	4.256^{-4}	4.24^{-3}
0.1740						4.24^{-6}	1.83^{-3}	3.32^{-5}	1.77^{-3}	[illegible]	4.02^{-3}
0.1681							1.85^{-3}	2.98^{-5}	1.60^{-3}	3.452^{-4}	3.83^{-3}
0.1626							1.89^{-3}	2.67^{-5}	1.45^{-3}	3.125^{-4}	3.68^{-3}
0.1574							1.92^{-3}	2.40^{-5}	1.31^{-3}	2.839^{-4}	3.53^{-3}
0.1526							1.94^{-3}	2.19^{-5}	1.20^{-3}	2.749^{-4}	3.44^{-3}
0.1480							1.98^{-3}	2.00^{-5}	1.09^{-3}	2.361^{-4}	3.33^{-3}
0.1437							2.01^{-3}	1.83^{-5}	1.00^{-3}	2.157^{-4}	3.25^{-3}
0.1397							2.03^{-3}	1.68^{-5}	9.18^{-4}	1.981^{-4}	3.16^{-3}
0.1359							2.06^{-3}	1.55^{-5}	8.45^{-4}	1.821^{-3}	4.74^{-3}
0.1322							2.09^{-3}	1.43^{-5}	7.79^{-4}	6.863^{-3}	9.74^{-3}
0.1288							2.12^{-3}	[illegible]	7.19^{-4}	8.973^{-3}	1.18^{-2}
0.1255							2.15^{-3}	[illegible]	6.67^{-4}	8.313^{-3}	1.11^{-2}
0.1224							2.18^{-3}	1.13^{-5}	6.18^{-4}	7.717^{-3}	1.05^{-2}
0.1195							2.21^{-3}	1.04^{-5}	5.75^{-4}	7.175^{-3}	9.98^{-3}
0.1167							2.22^{-3}	9.79^{-6}	5.35^{-4}	6.674^{-3}	9.43^{-3}

Table 52

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : T = 12,000°K and $\rho/\rho_0 = 10^{-2}$

λ (μ)	$N_2(1^+)$	$N_2(2^+)$	$N_2^+(1^-)$	NO β	NO γ	O_2(S-R)	$\mu_{PD(O^-)}$	μ_{ff}	$\mu_{PE(N)}$	$\mu_{PE(O)}$	μ_{Total}
1.9837								4.23^{-3}	8.83^{-5}	0	4.32^{-3}
1.4168								1.58^{-3}	5.37^{-4}	1.231^{-4}	2.24^{-3}
1.1020	1.16^{-6}							7.43^{-4}	8.41^{-5}	1.506^{-4}	4.79^{-4}
0.9016	2.06^{-6}							4.36^{-4}	6.08^{-4}	1.062^{-4}	1.16^{-3}
0.7630	2.55^{-6}						1.19^{-5}	2.63^{-4}	9.11^{-4}	1.090^{-4}	1.30^{-3}
0.6612	2.38^{-6}						1.45^{-5}	1.71 [illegible]	6.84^{-4}	1.275^{-4}	9.995^{-4}
0.5834	1.56^{-6}		1.80^{-7}				1.58^{-5}	1.16^{-4}	4.91^{-4}	9.498^{-5}	7.19^{-4}
0.5220	3.08^{-7}		3.68^{-6}	1.58^{-8}			1.68^{-5}	8.33^{-5}	4.27^{-4}	6.807^{-5}	5.99^{-4}
0.4723		1.82^{-7}	2.64^{-5}	4.98^{-8}			1.75^{-5}	6.15^{-5}	5.05^{-4}	7.102^{-5}	6.82^{-4}
0.4312		5.63^{-7}	7.83^{-5}	1.47^{-7}		2.90^{-8}	1.81^{-5}	4.66^{-5}	7.21^{-4}	1.081^{-4}	9.73^{-4}
0.3967		1.76^{-6}	1.45^{-4}	9.80^{-7}		6.09^{-8}	1.83^{-5}	3.63^{-5}	5.96^{-4}	1.142^{-4}	9.11^{-4}
0.3673		3.38^{-6}	1.39^{-4}	1.96^{-7}		3.44^{-8}	1.85^{-5}	2.88^{-5}	4.72^{-4}	9.048^{-5}	7.53^{-4}
0.3420		2.84^{-6}	3.80^{-5}	2.30^{-7}	3.18^{-10}	9.50^{-8}	2.77^{-5}	2.33^{-5}	3.95^{-4}	7.301^{-5}	5.60^{-4}
0.3199		5.00^{-6}		2.53^{-7}	5.12^{-9}	6.57^{-8}	3.29^{-5}	1.90^{-5}	4.21^{-4}	5.974^{-5}	5.38^{-4}
0.3006		2.95^{-6}		3.50^{-7}	1.61^{-8}	9.59^{-8}	3.55^{-5}	1.58^{-5}	4.61^{-4}	6.279^{-5}	5.79^{-4}
0.2834		4.27^{-7}		3.12^{-7}	5.68^{-8}	1.00^{-7}	3.73^{-5}	1.32^{-5}	7.04^{-4}	7.045^{-5}	8.26^{-4}
0.2681				3.96^{-7}	1.22^{-7}	9.15^{-8}	3.86^{-5}	1.12^{-5}	5.96^{-4}	7.348^{-5}	7.20^{-4}
0.2543				6.15^{-7}	3.01^{-7}	1.03^{-7}	3.96^{-5}	9.54^{-6}	5.08^{-4}	1.129^{-4}	6.71^{-4}
0.2419				3.88^{-7}	8.90^{-7}	4.11^{-8}	4.06^{-5}	8.21^{-6}	3.77^{-4}	9.717^{-5}	5.24^{-4}
0.2307				3.87^{-7}	3.86^{-7}	1.38^{-8}	4.17^{-5}	7.12^{-6}	3.79^{-4}	8.417^{-5}	5.13^{-4}
0.2204				3.12^{-7}	2.65^{-7}	2.80^{-7}	4.25^{-5}	6.23^{-6}	3.31^{-4}	7.354^{-5}	4.55^{-4}
0.2110				7.91^{-7}	5.6[illegible] $^{-7}$	2.32^{-7}	4.63^{-5}	5.50^{-6}	2.92^{-4}	6.449^{-5}	4.10^{-4}
0.2024				3.55^{-7}	4.85^{-7}	1.84^{-9}	4.84^{-5}	4.85^{-6}	2.56^{-4}	5.695^{-5}	3.67^{-4}
0.1945					2.54^{-7}	4.12^{-9}	4.94^{-5}	4.30^{-6}	2.28^{-4}	5.047^{-5}	3.33^{-4}
0.1871						6.60^{-10}	5.05^{-5}	3.82^{-6}	2.02^{-4}	4.503^{-5}	3.01^{-4}
0.1803						1.38^{-8}	5.13^{-5}	3.40^{-6}	1.82^{-4}	4.021^{-5}	2.77^{-4}
0.1740						3.79^{-8}	5.20^{-5}	3.04^{-6}	1.63^{-4}	3.619^{-5}	2.54^{-4}
0.1681							5.31^{-5}	2.73^{-6}	1.47^{-4}	3.261^{-5}	2.36^{-4}
0.1626							5.41^{-5}	2.45^{-6}	1.33^{-4}	2.953^{-5}	2.20^{-4}
0.1574							5.49^{-5}	2.20^{-6}	1.21^{-4}	2.682^{-5}	2.05^{-4}
0.1526							5.57^{-5}	2.01^{-6}	1.10^{-4}	2.645^{-5}	1.95^{-4}
0.1480							5.67^{-5}	1.83^{-6}	1.00^{-4}	2.231^{-5}	1.81^{-4}
0.1437							5.75^{-5}	1.67^{-6}	9.19^{-5}	2.038^{-5}	1.71^{-4}
0.1397							5.83^{-5}	1.53^{-6}	8.43^{-5}	1.872^{-5}	1.63^{-4}
0.1359							5.90^{-5}	1.42^{-6}	7.75^{-5}	1.721^{-4}	3.10^{-4}
0.1322							5.98^{-5}	1.30^{-6}	7.15^{-5}	6.484^{-4}	7.81^{-4}
0.1288							6.08^{-5}	1.20^{-6}	6.60^{-5}	8.478^{-4}	9.76^{-4}
0.1255							6.16^{-5}	1.11^{-6}	6.12^{-5}	7.854^{-4}	9.09^{-4}
0.1224							6.24^{-5}	1.04^{-6}	5.67^{-5}	7.242^{-4}	8.49^{-4}
0.1195							6.32^{-5}	9.56^{-7}	5.28^{-5}	6.779^{-4}	7.95^{-4}
0.1167							6.37^{-5}	8.96^{-7}	4.91^{-5}	6.305^{-4}	7.45^{-4}

Table 53

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : T = 12,000°K and $\rho/\rho_o = 10^{-3}$

λ (μ)	$N_2(1^+)$	$N_2(2^+)$	$N_2^+(1^-)$	NO β	NO γ	O_2(S-R)	$\mu_{PD(O^-)}$	μ_{ff}	$\mu_{PE(N)}$	$\mu_{PE(O)}$	μ_{Total}
1.9837								3.53^{-4}	6.02^{-6}	0	3.60^{-4}
1.4168								1.29^{-4}	4.03^{-5}	1.015^{-5}	1.79^{-4}
1.1020	6.52^{-9}							6.06^{-5}	6.31^{-6}	1.242^{-5}	7.93^{-5}
0.9016	1.16^{-8}							3.32^{-5}	4.56^{-5}	8.758^{-6}	8.76^{-5}
0.7630	1.44^{-8}						2.71^{-7}	2.00^{-5}	6.82^{-5}	8.986^{-6}	9.75^{-5}
0.6612	1.34^{-8}						3.30^{-7}	1.30^{-5}	5.13^{-5}	1.051^{-5}	7.51^{-5}
0.5834	8.78^{-9}		3.67^{-9}				3.59^{-7}	8.83^{-6}	3.68^{-5}	7.829^{-6}	5.38^{-5}
0.5220	1.73^{-9}		7.50^{-8}	9.77^{-11}			3.83^{-7}	6.33^{-6}	3.20^{-5}	5.612^{-6}	4.43^{-5}
0.4723		1.02^{-9}	5.38^{-7}	3.09^{-10}			3.97^{-7}	4.67^{-6}	3.78^{-5}	5.859^{-6}	4.93^{-5}
0.4312		3.18^{-9}	1.60^{-6}	9.13^{-10}		1.97^{-10}	4.12^{-7}	3.54^{-6}	5.40^{-5}	8.913^{-6}	6.85^{-5}
0.3967		9.94^{-9}	2.96^{-6}	6.07^{-10}		4.13^{-10}	4.15^{-7}	2.76^{-6}	4.46^{-5}	9.410^{-6}	6.01^{-5}
0.3673		1.91^{-8}	2.82^{-6}	1.22^{-9}		2.33^{-10}	4.20^{-7}	2.19^{-6}	3.54^{-5}	7.459^{-6}	4.83^{-5}
0.3420		1.60^{-8}	7.75^{-7}	1.43^{-9}	1.97^{-12}	6.45^{-10}	6.30^{-7}	1.77^{-6}	2.96^{-5}	6.018^{-6}	3.88^{-5}
0.3199		2.82^{-8}		1.57^{-9}	3.17^{-11}	4.46^{-10}	7.47^{-7}	1.45^{-6}	3.15^{-5}	4.925^{-6}	3.86^{-5}
0.3006		1.66^{-8}		2.17^{-9}	9.97^{-11}	6.51^{-10}	8.06^{-7}	1.20^{-6}	3.46^{-5}	5.176^{-6}	4.18^{-5}
0.2834		2.41^{-9}		1.93^{-9}	3.52^{-10}	6.81^{-10}	8.47^{-7}	1.00^{-6}	5.28^{-5}	5.807^{-6}	6.04^{-5}
0.2681				2.45^{-9}	7.58^{-10}	6.21^{-10}	8.77^{-7}	8.49^{-7}	4.46^{-5}	6.057^{-6}	5.24^{-5}
0.2543				3.81^{-9}	1.87^{-9}	6.98^{-10}	9.00^{-7}	7.26^{-7}	3.80^{-5}	9.304^{-6}	4.89^{-5}
0.2419				2.40^{-9}	5.51^{-9}	2.79^{-10}	9.24^{-7}	6.24^{-7}	2.83^{-5}	8.010^{-6}	3.78^{-5}
0.2307				2.40^{-9}	2.39^{-9}	9.37^{-11}	9.47^{-7}	5.41^{-7}	2.84^{-5}	6.939^{-6}	3.68^{-5}
0.2204				1.93^{-9}	1.64^{-9}	1.90^{-9}	9.65^{-7}	4.74^{-7}	2.48^{-5}	6.062^{-6}	3.23^{-5}
0.2110				4.90^{-9}	3.48^{-9}	1.58^{-9}	1.05^{-6}	4.18^{-7}	2.19^{-5}	5.316^{-6}	2.87^{-5}
0.2024				2.20^{-9}	3.00^{-9}	1.25^{-11}	1.10^{-6}	3.69^{-7}	1.92^{-5}	4.694^{-6}	2.54^{-5}
0.1945					1.57^{-9}	2.79^{-11}	1.12^{-6}	3.27^{-7}	1.71^{-5}	4.161^{-6}	2.27^{-5}
0.1871						4.48^{-12}	1.15^{-6}	2.91^{-7}	1.52^{-5}	3.712^{-6}	2.03^{-5}
0.1803						9.37^{-11}	1.17^{-6}	2.59^{-7}	1.36^{-5}	3.315^{-6}	1.83^{-5}
0.1740						2.57^{-10}	1.18^{-6}	2.31^{-7}	1.22^{-5}	2.983^{-6}	1.66^{-5}
0.1681							1.21^{-6}	2.08^{-7}	1.10^{-5}	2.689^{-6}	1.51^{-5}
0.1626							1.23^{-6}	1.86^{-7}	9.97^{-6}	2.434^{-6}	1.38^{-5}
0.1574							1.25^{-6}	1.67^{-7}	9.04^{-6}	2.211^{-6}	1.27^{-5}
0.1526							1.27^{-6}	1.53^{-7}	8.23^{-6}	2.180^{-6}	1.18^{-5}
0.1480							1.29^{-6}	1.39^{-7}	7.53^{-6}	1.839^{-6}	1.08^{-5}
0.1437							1.31^{-6}	1.29^{-7}	6.89^{-6}	1.680 [illegible]	1.00^{-5}
0.1397							1.32^{-6}	1.17^{-7}	6.32^{-6}	1.543 [illegible]	9.30^{-6}
0.1359							1.34^{-6}	1.08^{-7}	5.81^{-6}	1.418^{-5}	2.14^{-5}
0.1322							1.36^{-6}	9.92^{-8}	5.36^{-6}	5.345^{-5}	6.03^{-5}
0.1288							1.38^{-6}	9.13^{-8}	4.94^{-6}	6.989^{-5}	7.63^{-5}
0.1255							1.40^{-6}	8.47^{-8}	4.59^{-6}	6.474^{-5}	7.08^{-5}
0.1224							1.42^{-6}	7.87^{-8}	4.25^{-6}	6.011^{-5}	6.59^{-5}
0.1195							1.44^{-6}	7.26^{-8}	3.96^{-6}	5.588^{-5}	6.14^{-5}
0 1167							1.45^{-6}	6.81^{-8}	3.68^{-6}	5.198^{-5}	5.72^{-5}

Table 54

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : T = 12,000°K and $\rho/\rho_0 = 10^{-4}$

λ (μ)	$N_2(1^+)$	$N_2(2^+)$	$N_2^+(1^-)$	NO β	NO γ	O_2 (S-R)	$\mu_{PD(O^-)}$	μ_{ff}	$\mu_{PE(N)}$	$\mu_{PE(O)}$	μ_{Total}
1.9837								1.59^{-5}	2.90^{-7}	0	1.62^{-5}
1.4168								5.83^{-6}	1.76^{-6}	5.355^{-7}	8.89^{-6}
1.1020	1.25^{-11}							2.74^{-6}	2.76^{-7}	6.550^{-7}	3.68^{-6}
0.9016	2.22^{-11}							1.50^{-6}	2.00^{-6}	4.620^{-7}	3.96^{-6}
0.7630	2.75^{-11}						3.63^{-9}	9.02^{-7}	2.99^{-6}	4.741^{-7}	4.37^{-6}
0.6612	2.56^{-11}						3.69^{-9}	5.88^{-7}	2.24^{-6}	5.344^{-7}	3.38^{-6}
0.5834	2.56^{-11}						4.01^{-9}	3.99^{-7}	1.61^{-6}	4.130^{-7}	2.42^{-6}
0.5220	1.68^{-11}		3.31^{-11}				4.28^{-9}	2.86^{-7}	1.40^{-6}	2.961^{-7}	1.99^{-6}
0.4723	3.32^{-12}		6.76^{-10}	2.25^{-13}			4.44^{-9}	2.11^{-7}	1.66^{-6}	3.089^{-7}	2.19^{-6}
0.4312		1.96^{-12}	4.85^{-9}	7.12^{-13}			4.61^{-9}	1.60^{-7}	2.37^{-6}	4.702^{-7}	3.02^{-6}
0.3967		6.08^{-12}	1.44^{-8}	2.11^{-12}		5.48^{-13}	4.64^{-9}	1.25^{-7}	1.96^{-6}	4.964^{-7}	2.62^{-6}
0.3673		1.90^{-11}	2.67^{-8}	1.40^{-12}		1.15^{-12}	4.69^{-9}	9.91^{-8}	1.55^{-6}	3.935^{-7}	2.07^{-6}
0.3420		3.65^{-11}	2.55^{-8}	2.80^{-12}		6.49^{-13}	7.04^{-9}	8.00^{-8}	1.30^{-6}	3.175^{-7}	1.71^{-6}
0.3199		3.07^{-11}	6.98^{-9}	3.29^{-12}	4.55^{-15}	1.79^{-12}	8.36^{-9}	6.55^{-8}	1.38^{-6}	2.598^{-7}	1.71^{-6}
0.3006		5.40^{-11}		3.62^{-12}	7.32^{-14}	1.24^{-12}	9.02^{-9}	5.43^{-8}	1.51^{-6}	2.731^{-7}	1.84^{-6}
0.2834		3.18^{-11}		5.01^{-12}	2.30^{-13}	1.81^{-12}	9.48^{-9}	4.54^{-8}	2.31^{-6}	3.069^{-7}	2.67^{-6}
0.2681		4.61^{-12}		4.46^{-12}	8.12^{-13}	1.89^{-12}	9.81^{-9}	3.84^{-8}	1.96^{-6}	3.196^{-7}	2.33^{-6}
0.2543				5.67^{-12}	1.75^{-12}	1.73^{-12}	1.01^{-8}	3.28^{-8}	1.67^{-6}	4.908^{-7}	2.20^{-6}
0.2419				8.80^{-12}	4.30^{-12}	1.94^{-12}	1.03^{-8}	2.82^{-8}	1.24^{-6}	4.226^{-7}	1.70^{-6}
0.2307				5.55^{-12}	1.27^{-11}	7.75^{-13}	1.06^{-8}	2.45^{-8}	1.24^{-6}	3.661^{-7}	1.65^{-6}
0.2204				5.53^{-12}	5.52^{-12}	2.61^{-13}	1.08^{-8}	2.14^{-8}	1.09^{-6}	3.198^{-7}	1.44^{-6}
0.2110				4.46^{-12}	3.79^{-12}	5.28^{-12}	1.18^{-8}	1.89^{-8}	9.58^{-7}	2.804^{-7}	1.27^{-6}
0.2024				1.13^{-11}	8.02^{-12}	4.38^{-12}	1.23^{-8}	1.67^{-8}	8.42^{-7}	2.477^{-7}	1.12^{-6}
0.1945				5.08^{-12}	6.93^{-12}	3.47^{-14}	1.26^{-8}	1.48^{-8}	7.48^{-7}	2.195^{-7}	9.95^{-7}
0.1871					3.63^{-12}	7.77^{-14}	1.28^{-8}	1.31^{-8}	6.64^{-7}	1.958^{-7}	8.86^{-7}
0.1803						1.25^{-14}	1.30^{-8}	1.17^{-8}	5.97^{-7}	1.749^{-7}	7.97^{-7}
0.1740						2.61^{-13}	1.32^{-8}	1.05^{-8}	5.34^{-7}	1.574^{-7}	7.15^{-7}
0.1681						7.15^{-13}	1.35^{-8}	9.38^{-9}	4.81^{-7}	1.418^{-7}	6.46^{-7}
0.1626							1.38^{-8}	8.42^{-9}	4.36^{-7}	1.284^{-7}	5.86^{-7}
0.1574							1.40^{-8}	7.57^{-9}	3.96^{-7}	1.167^{-7}	5.35^{-7}
0.1526							1.41^{-8}	6.90^{-9}	3.60^{-7}	1.150^{-7}	4.96^{-7}
0.1480							1.44^{-8}	6.28^{-9}	3.30^{-7}	9.701^{-8}	4.48^{-7}
0.1437							1.46^{-8}	5.75^{-9}	3.02^{-7}	8.863^{-8}	4.11^{-7}
0.1397							1.48^{-8}	5.28^{-9}	2.77^{-7}	8.140^{-8}	3.78^{-7}
0.1359							1.50^{-8}	4.87^{-9}	2.54^{-7}	7.483^{-7}	1.02^{-6}
0.1322							1.52^{-8}	4.48^{-9}	2.35^{-7}	2.820^{-6}	3.08^{-6}
0.1288							1.55^{-8}	4.13^{-9}	2.16^{-7}	3.687^{-6}	3.92^{-6}
0.1255							1.57^{-8}	3.83^{-9}	2.01^{-7}	3.416^{-6}	3.64^{-6}
0.1224							1.59^{-8}	3.56^{-9}	1.86^{-7}	3.171^{-6}	3.38^{-6}
0.1195							1.61^{-8}	3.29^{-9}	1.73^{-7}	2.948^{-6}	3.14^{-6}
0.1167							1.62^{-8}	3.08^{-9}	1.61^{-7}	2.742^{-6}	2.92^{-6}

Table 55

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : T = 12,000°K and ρ/ρ_o = 10^{-5}

λ (μ)	$N_2(1^+)$	$N_2(2^+)$	$N_2^+(1^-)$	NO β	NO γ	O_2(S-R)	$\mu_{PD(O^-)}$	μ_{ff}	$\mu_{PE(N)}$	$\mu_{PE(O)}$	μ_{Total}
1.9837								2.97^{-7}	5.26^{-9}	0	3.02^{-7}
1.4168								1.09^{-7}	3.20^{-8}	1.113^{-8}	1.52^{-7}
1.1020	4.10^{-15}							5.10^{-8}	5.01^{-9}	1.361^{-8}	6.96^{-8}
0.9010	7.30^{-15}							2.79^{-8}	3.62^{-8}	9.60^{-9}	7.37^{-8}
0.7630	9.03^{-15}						8.64^{-12}	1.68^{-8}	5.42^{-8}	9.850^{-9}	8.09^{-8}
0.6612	8.42^{-15}						1.05^{-11}	1.05^{-8}	4.07^{-8}	1.152^{-8}	6.27^{-8}
0.5834	5.52^{-14}		7.98^{-14}				1.15^{-11}	7.43^{-9}	2.92^{-8}	8.582^{-9}	4.52^{-8}
0.5220	1.09^{-15}		1.63^{-12}	8.51^{-17}			1.22^{-11}	5.33^{-9}	2.54^{-8}	6.151^{-9}	3.69^{-8}
0.4723		6.44^{-16}	1.17^{-11}	2.69^{-16}			1.27^{-11}	3.93^{-9}	3.01^{-8}	6.417^{-9}	4.04^{-8}
0.4312		2.00^{-15}	3.47^{-11}	7.95^{-16}		2.38^{-16}	1.31^{-11}	2.98^{-9}	4.29^{-8}	9.769^{-9}	5.57^{-8}
0.3967		6.25^{-15}	6.43^{-11}	5.29^{-16}		5.00^{-16}	1.32^{-11}	2.32^{-9}	3.55^{-8}	1.031^{-8}	4.82^{-8}
0.3673		$1.2[illegible]^{-14}$	6.14^{-11}	1.06^{-15}		2.82^{-16}	1.34^{-11}	1.84^{-9}	2.81^{-8}	8.175^{-9}	3.82^{-8}
0.3420		1.01^{-14}	1.68^{-11}	1.24^{-15}	1.72^{-18}	7.80^{-16}	2.01^{-11}	1.49^{-9}	2.35^{-8}	6.597^{-9}	3.16^{-8}
0.3199		1.77^{-14}		1.37^{-15}	2.77^{-17}	5.39^{-16}	2.39^{-11}	1.22^{-9}	2.50^{-8}	5.398^{-9}	3.16^{-8}
0.3006		1.05^{-14}		1.89^{-15}	8.69^{-17}	7.87^{-16}	2.57^{-11}	1.01^{-9}	2.75^{-8}	5.673^{-9}	3.42^{-8}
0.2834		1.51^{-15}		1.68^{-15}	3.07^{-16}	8.23^{-16}	2.70^{-11}	8.45^{-10}	4.19^{-8}	6.365^{-9}	4.92^{-8}
0.2681				2.14^{-15}	6.60^{-16}	7.51^{-16}	2.80^{-11}	7.14^{-10}	3.55^{-8}	6.639^{-9}	4.28^{-8}
0.2543				3.32^{-15}	1.63^{-15}	8.45^{-16}	2.87^{-11}	6.11^{-10}	3.02^{-8}	1.020^{-8}	4.10^{-8}
0.2419				2.10^{-15}	4.80^{-15}	3.37^{-16}	2.95^{-11}	5.25^{-10}	2.25^{-8}	8.780^{-9}	3.19^{-8}
0.2307				2.09^{-15}	2.08^{-15}	1.13^{-16}	3.02^{-11}	4.55^{-10}	2.25^{-8}	7.606^{-9}	3.06^{-8}
0.2204				$1.68^{-1[illegible]}$	1.43^{-15}	2.30^{-15}	3.08^{-11}	3.99^{-10}	1.97^{-8}	6.645^{-9}	2.68^{-8}
0.2110				4.27^{-15}	3.03^{-15}	1.91^{-15}	3.36^{-11}	3.52^{-10}	1.74^{-8}	5.827^{-9}	2.36^{-8}
0.2024				1.92^{-15}	2.62^{-15}	1.51^{-17}	3.51^{-11}	3.10^{-10}	1.53^{-8}	5.146^{-9}	2.08^{-8}
0.1945					1.37^{-15}	3.38^{-17}	3.59^{-11}	2.75^{-10}	1.36^{-8}	4.561^{-9}	1.85^{-8}
0.1871						5.42^{-18}	3.66^{-11}	2.45^{-10}	1.20^{-8}	4.069^{-9}	$1.[illegible]4^{-8}$
0.1803						1.13^{-16}	3.72^{-11}	2.18^{-10}	1.08^{-8}	3.634^{-9}	1.47^{-8}
0.1740						3.11^{-16}	3.77^{-11}	1.95^{-10}	9.67^{-9}	3.270^{-9}	1.32^{-8}
0.1681							3.85^{-11}	1.75^{-10}	8.73^{-9}	2.947^{-9}	1.19^{-8}
0.1626							3.93^{-11}	1.57^{-10}	7.92^{-9}	2.668^{-9}	1.08^{-8}
0.1574							3.98^{-11}	1.41^{-10}	7.18^{-9}	2.424^{-9}	9.78^{-9}
0.1526							4.04^{-11}	1.28^{-10}	6.54^{-9}	$2.3[illegible]0^{-9}$	9.10^{-9}
0.1480							4.11^{-11}	1.17^{-10}	5.98^{-9}	2.016^{-9}	8.16^{-9}
0.1437							4.17^{-11}	1.07^{-10}	5.47^{-9}	$1.84[illegible]^{-9}$	7.46^{-9}
0.1397							4.23^{-11}	9.82^{-11}	5.02^{-9}	1.691^{-9}	6.85^{-9}
0.1359							4.28^{-11}	9.06^{-11}	4.61^{-9}	1.555^{-8}	2.03^{-8}
0.1323							4.34^{-11}	8.35^{-11}	4.26^{-9}	5.859^{-8}	6.30^{-8}
0.1288							4.41^{-11}	7.69^{-11}	3.93^{-9}	7.660^{-8}	8.07^{-8}
0.1255							4.47^{-11}	7.13^{-11}	3.64^{-9}	7.097^{-8}	7.47^{-8}
0.1224							4.53^{-11}	6.62^{-11}	3.38^{-9}	6.589^{-8}	6.94^{-8}
0.1195							4.58^{-11}	6.11^{-11}	3.14^{-9}	6.125^{-8}	6.45^{-8}
0.1167							4.62^{-11}	5.73^{-11}	2.92^{-9}	5.697^{-8}	6.0^{-8}

Table 55

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : $T = 12,000^{o}K$ and $\rho/\rho_o = 10^{-5}$

λ (μ)	$N_2(1^+)$	$N_2(2^+)$	$N_2^+(1^-)$	NO β	NO γ	O_2 (S - R)	$\mu_{PD(O^-)}$	μ_{ff}	$\mu_{PE(N)}$	$\mu_{PE(O)}$	μ_{Total}
1.9837								2.97^{-7}	$5,26^{-9}$	0	3.02^{-7}
1.4168								1.09^{-7}	3.20^{-8}	1.113^{-8}	1.52^{-7}
1.1020	4.10^{-15}							5.10^{-8}	5.01^{-9}	1.361^{-8}	6.96^{-8}
0.9010	7.30^{-15}							2.79^{-8}	3.62^{-8}	9.60^{-9}	7.37^{-8}
0.7630	9.03^{-15}						8.64^{-12}	1.68^{-8}	5.42^{-8}	9.850^{-9}	8.09^{-8}
0.6612	8.42^{-15}						1.05^{-11}	1.05^{-8}	4.07^{-8}	1.152^{-8}	6.27^{-8}
0.5834	5.52^{-14}		7.98^{-14}				1.15^{-11}	7.43^{-9}	2.92^{-8}	8.582^{-9}	4.52^{-8}
0.5220	1.09^{-15}		1.63^{-12}	8.51^{-17}			1.22^{-11}	5.33^{-9}	2.54^{-8}	6.151^{-9}	3.69^{-8}
0.4723		6.44^{-16}	1.17^{-11}	2.69^{-16}			1.27^{-11}	3.93^{-9}	3.01^{-8}	6.417^{-9}	4.04^{-8}
0.4312		2.00^{-15}	3.47^{-11}	7.95^{-16}		2.38^{-16}	1.31^{-11}	2.98^{-9}	4.29^{-8}	9.769^{-9}	5.57^{-8}
0.3967		6.25^{-15}	6.43^{-11}	5.29^{-16}		5.00^{-16}	1.32^{-11}	2.32^{-9}	3.55^{-8}	1.031^{-8}	4.62^{-8}
0.3673		1.20^{-14}	6.14^{-11}	1.06^{-15}		2.82^{-16}	1.34^{-11}	1.84^{-9}	2.81^{-8}	8.175^{-9}	3.82^{-8}
0.3420		1.01^{-14}	1.68^{-11}	1.24^{-15}	1.72^{-18}	7.80^{-16}	2.01^{-11}	1.49^{-9}	2.35^{-8}	6.597^{-9}	3.16^{-8}
0.3199		1.77^{-14}		1.37^{-15}	2.77^{-17}	5.39^{-16}	2.39^{-11}	1.22^{-9}	2.50^{-8}	5.398^{-9}	3.16^{-8}
0.3006		1.05^{-14}		1.89^{-15}	8.69^{-17}	7.87^{-16}	2.57^{-11}	1.01^{-9}	2.75^{-8}	5.673^{-9}	3.42^{-8}
0.2834		1.51^{-15}		1.68^{-15}	3.07^{-16}	8.23^{-16}	2.70^{-11}	8.45^{-10}	4.19^{-8}	6.365^{-9}	4.92^{-8}
0.2681				2.14^{-15}	6.60^{-16}	7.51^{-16}	2.80^{-11}	7.14^{-10}	3.55^{-8}	6.639^{-9}	4.28^{-8}
0.2543				3.32^{-15}	1.63^{-15}	8.45^{-16}	2.87^{-11}	6.11^{-10}	3.02^{-8}	1.020^{-8}	4.10^{-8}
0.2419				2.10^{-15}	4.80^{-15}	3.37^{-16}	2.95^{-11}	5.25^{-10}	2.25^{-8}	8.780^{-9}	3.19^{-8}
0.2307				2.09^{-15}	2.08^{-15}	1.13^{-16}	3.02^{-11}	4.55^{-10}	2.25^{-8}	7.606^{-9}	3.06^{-8}
0.2204				1.68^{-15}	1.43^{-15}	2.30^{-15}	3.08^{-11}	3.99^{-10}	1.97^{-8}	6.645^{-9}	2.68^{-8}
0.2110				4.27^{-15}	3.03^{-15}	1.91^{-15}	3.36^{-11}	3.52^{-10}	1.74^{-8}	5.827^{-9}	2.36^{-8}
0.2024				1.92^{-15}	2.62^{-15}	1.51^{-17}	3.51^{-11}	3.10^{-10}	1.53^{-8}	5.146^{-9}	2.08^{-8}
0.1945					1.37^{-15}	3.38^{-17}	3.59^{-11}	2.75^{-10}	1.36^{-8}	4.561^{-9}	1.85^{-8}
0.1871						5.42^{-18}	3.66^{-11}	2.45^{-10}	1.20^{-8}	4.069^{-9}	1.[illegible]4^{-8}
0.1803						1.13^{-16}	3.72^{-11}	2.18^{-10}	1.08^{-8}	3.634^{-9}	1.47^{-8}
0.1740						3.11^{-16}	3.77^{-11}	1.95^{-10}	9.67^{-9}	3.270^{-9}	1.32^{-8}
0.1681							3.85^{-11}	1.75^{-10}	8.73^{-9}	2.947^{-9}	1.19^{-8}
0.1626							3.93^{-11}	1.57^{-10}	7.92^{-9}	2.668^{-9}	1.08^{-8}
0.1574							3.98^{-11}	1.41^{-10}	7.18^{-9}	2.424^{-9}	9.78^{-9}
0.1526							4.04^{-11}	1.28^{-10}	6.54^{-9}	2.390^{-9}	9.10^{-9}
0.1480							4.11^{-11}	1.17^{-10}	5.98^{-9}	2.016^{-9}	8.16^{-9}
0.1437							4.17^{-11}	1.07^{-10}	5.47^{-9}	1.841^{-9}	7.46^{-9}
0.1397							4.23^{-11}	9.82^{-11}	5.02^{-9}	1.691^{-9}	6.85^{-9}
0.1359							4.28^{-11}	9.06^{-11}	4.61^{-9}	1.555^{-8}	2.03^{-8}
0.1323							4.34^{-11}	8.35^{-11}	4.26^{-9}	5.859^{-8}	6.30^{-8}
0.1288							4.41^{-11}	7.69^{-11}	3.93^{-9}	7.660^{-8}	8.07^{-8}
0.1255							4.47^{-11}	7.13^{-11}	3.64^{-9}	7.097^{-8}	7.47^{-8}
0.1224							4.53^{-11}	6.62^{-11}	3.38^{-9}	6.589^{-8}	6.94^{-8}
0.1195							4.58^{-11}	6.11^{-11}	3.14^{-9}	6.125^{-8}	6.45^{-8}
0.1167							4.62^{-11}	5.73^{-11}	2.92^{-9}	5.697^{-8}	6.0^{-8}

Table 56

ABSORPTION COEFFICIENT OF AIR (cm^{-1}) : T = 12,000°K and $\rho/\rho_o = 10^{-6}$

λ (μ)	$N_2(1^+)$	$N_2(2^+)$	$N_2^+(1^-)$	NO β	NO γ	O_2 (S-R)	$\mu_{PD(O^-)}$	μ_{ff}	$\mu_{PE(N)}$	$\mu_{PE(O)}$	μ_{Total}
1.9837								3.30^{-9}	5.81^{-11}	0	3.36^{-9}
1.4168								1.21^{-9}	3.54^{-10}	1.271^{-10}	1.69^{-9}
1.1020	5.00^{-17}							5.68^{-10}	5.54^{-11}	1.555^{-10}	7.74^{-10}
0.9016	8.91^{-17}							3.11^{-10}	4.00^{-10}	1.097^{-10}	8.21^{-10}
0.7630	1.10^{-16}						1.04^{-14}	1.87^{-10}	5.99^{-10}	1.125^{-10}	8.99^{-10}
0.6612	1.03^{-16}						1.26^{-14}	1.22^{-10}	4.50^{-10}	1.316^{-10}	7.04^{-10}
0.5834	6.73^{-17}		9.25^{-17}				1.38^{-14}	8.28^{-11}	3.23^{-10}	9.80[illegible]$^{-11}$	5.04^{-10}
0.5220	1.33^{-17}		1.89^{-15}	1.07^{-20}			1.47^{-14}	5.93^{-11}	2.81^{-10}	7.026^{-11}	4.10^{-10}
0.4723		6.41^{-18}	1.36^{-14}	3.40^{-20}			1.52^{-14}	4.38^{-11}	3.32^{-10}	7.330^{-11}	4.49^{-10}
0.4312		1.99^{-17}	4.02^{-14}	1.00^{-19}		3.09^{-20}	1.58^{-14}	3.32^{-11}	4.74^{-11}	1.116^{-11}	6.19^{-10}
0.3967		6.22^{-17}	7.45^{-14}	6.67^{-20}		6.48^{-20}	1.59^{-14}	2.59^{-11}	3.92^{-10}	1.178^{-10}	5.36^{-10}
0.3673		1.19^{-16}	7.11^{-14}	1.34^{-19}		3.66^{-20}	1.61^{-14}	2.05^{-11}	3.11^{-10}	9.338^{-11}	4.25^{-10}
0.3420		1.00^{-16}	1.95^{-14}	1.57^{-19}	2.17^{-22}	1.01^{-19}	2.42^{-14}	1.66^{-11}	2.60^{-10}	7.535^{-11}	3.52^{-10}
0.3199		1.76^{-16}		1.72^{-19}	3.49^{-21}	7.00^{-20}	2.87^{-14}	1.36^{-11}	2.77^{-10}	6.166^{-11}	3.53^{-10}
0.3006		1.04^{-16}		2.39^{-19}	1.10^{-20}	1.02^{-19}	3.09^{-14}	1.13^{-11}	3.04^{-10}	6.480^{-11}	3.80^{-10}
0.2834		1.51^{-17}		2.12^{-19}	3.87^{-20}	1.07^{-19}	3.25^{-14}	9.41^{-12}	4.64^{-10}	7.271^{-11}	5.46^{-10}
0.2681				2.70^{-19}	8.33^{-20}	9.74^{-20}	3.36^{-14}	7.96^{-12}	3.92^{-10}	7.584^{-11}	4.76^{-10}
0.2543				4.19^{-19}	2.05^{-19}	1.10^{-19}	3.45^{-14}	6.80^{-12}	3.34^{-10}	1.165^{-10}	4.58^{-10}
0.2419				2.64^{-19}	6.06^{-19}	4.38^{-20}	3.55^{-14}	5.85^{-12}	2.48^{-10}	1.003^{-10}	3.54^{-10}
0.2307				2.64^{-19}	2.63^{-19}	1.47^{-20}	3.64^{-14}	5.07^{-12}	2.49^{-10}	8.687^{-11}	3.41^{-10}
0.2204				2.12^{-19}	1.81^{-19}	2.98^{-19}	3.70^{-14}	4.44^{-12}	2.18^{-10}	7.590^{-11}	2.98^{-10}
0.2110				5.39^{-19}	3.82^{-19}	2.47^{-19}	4.04^{-14}	3.92^{-12}	1.92^{-10}	6.656^{-11}	2.63^{-10}
0.2024				2.42^{-19}	3.30^{-19}	1.96^{-21}	4.22^{-14}	3.46^{-12}	1.69^{-10}	5.879^{-11}	2.31^{-10}
0.1945					1.73^{-19}	4.39^{-21}	4.31^{-14}	3.06^{-12}	1.50^{-10}	5.209^{-11}	2.05^{-10}
0.1871						7.03^{-22}	4.40^{-14}	2.72^{-12}	1.33^{-10}	4.647^{-11}	1.83^{-10}
0.1803						1.47^{-20}	4.47^{-14}	2.42^{-12}	1.20^{-10}	4.150^{-11}	1.64^{-10}
0.1740						4.04^{-20}	4.54^{-14}	2.17^{-12}	1.07^{-10}	3.735^{-11}	1.46^{-10}
0.1681							4.63^{-14}	1.94^{-12}	9.65^{-11}	3.366^{-11}	1.32^{-10}
0.1626							4.72^{-14}	1.74^{-12}	8.75^{-11}	3.048^{-11}	1.20^{-10}
0.1574							4.79^{-14}	1.57^{-12}	7.94^{-11}	2.768^{-11}	1.09^{-10}
0.1526							4.85^{-14}	1.43^{-12}	7.23^{-11}	2.730^{-11}	1.01^{-10}
0.1480							4.95^{-14}	1.30^{-12}	6.61^{-11}	2.302^{-11}	9.04^{-11}
0.1437							5.01^{-14}	1.19^{-12}	5.05^{-11}	2.103^{-11}	8.27^{-11}
0.1397							5.08^{-14}	1.09^{-12}	5.55^{-11}	1.932^{-11}	7.59^{-11}
0.1359							5.15^{-14}	1.01^{-12}	5.10^{-11}	1.776^{-11}	2.30^{-10}
0.1322							5.22^{-14}	9.29^{-13}	4.71^{-11}	6.692^{-11}	7.17^{-10}
0.1288							5.31^{-14}	8.56^{-13}	4.34^{-11}	8.750^{-11}	9.19^{-10}
0.1255							5.37^{-14}	7.94^{-13}	4.03^{-11}	8.106^{-11}	8.52^{-10}
0.1224							5.44^{-14}	7.37^{-13}	3.73^{-11}	7.526^{-11}	7.91^{-10}
0.1195							5.51^{-14}	6.81^{-13}	3.47^{-11}	6.996^{-11}	7.35^{-10}
0.1167							5.55^{-14}	6.39^{-13}	3.23^{-11}	6.508^{-11}	6.84^{-10}

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Unclassified Report

Tables of integrated absorption coefficients have been evaluated for high-temperature air by summation of the contributions from the following discrete transitions:

NO	$X^2\Pi \rightarrow B^2\Pi$	Beta
	$X^2\Pi \rightarrow A^2\Sigma$	Gamma
O_2	$X^3\Sigma_g \rightarrow B^3\Sigma_u$	Schumann-Runge
N_2	$A^3\Sigma_u^+ \rightarrow B^3\Pi_g$	First positive
	$B^3\Pi_g \rightarrow C^3\Pi_u$	Second positive
N_2^+	$X^2\Sigma_g^+ \rightarrow B^2\Sigma_u^+$	First negative

(over)

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1. Air - Absorption Coefficients
2. Air - Radiation Absorption
3. Radiation - Absorption

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II. J. Sokoloff
III. R. W. Nicholls

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- O^- Photodetachment absorption
- N, O Photoelectric absorption from excited states
- e Free-free absorption in the presence of ionic fields

The tables have been computed for dry air in the temperature range from 1,000°K to 12,000°K, at equal energy increments of 0.25 ev (2,016.5 cm^{-1}), in the wavelength range from 1,167 Å to 19,837 Å, and for density ratios relative to sea level, ρ/ρ_0, at each order of magnitude from 10 to 10^{-6}.

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